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A Calendar of Upcoming Events

30 July-1 August 1976
RIVERCON 2 (Louisville area SF Conference) at Louisville, KY. Info: FOSFA, Box 8251, Louisville, KY 40208.

6-8 August 1976
NORFOLK (VA) Star Trek Convention at Holiday Inn Scopt, Norfolk, Va. Registration $5 in advance, $7 at the door. Info: Jim Landau, Star Trek Convention, 5353 Columbia Pike, 312, Arlington, VA 22204.

13-14 August 1976
INTERCON (Star Trek oriented conference) at Tri-Arc Travelodge, Salt Lake City, Utah. Registration $12 attending, $5 supporting. Info: Intercon, Box 11057, Salt Lake City, UT 84147.

27-29 August 1976
DDEPSOUTHCON XIV (Southern regional SF Conference) at Atlanta, Ga. Registration $7. Info: Steve Hughes, 5831 Hillside Dr., Doraville, GA 30040.

27-29 August 1976
BUBONICON 7 (New Mexico regional SF Conference) at Ramada Inn, Albuquerque, NM. Guest of Honor—Bill Rotsler. Registration $4 until 31 July, $5 thereafter. Info: Roy Tackett, 915 Green Valley Road NW, Albuquerque, NM 87107.

2-6 September 1976
MIDAMERICON (34th WORLD SCIENCE FICTION CONVENTION) at Hotel Muehlbach, Kansas City, Mo. Guest of Honor—Robert A. Heinlein, Fan Guest of Honor—George Barr; Toastmaster—Bob Tucker. Panels, talks, masquerade, films; presentation of the Hugos and the John W. Campbell Award for Best New Writer. Registration: $6 non-attending; $50 attending. The committee is handling all room reservations so don't write directly to the hotel. Info: P.O. Box 221, Kansas City, MO 64141.

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GENETIC POLITICS

In 1831 Robert Brown (the man for whom Brownian Motion is named) discovered that each cell in every living organism has a nucleus. An interesting bit of basic research.

In 1928 Sir Alexander Fleming discovered penicillin, the first antibiotic. Part serendipity, this discovery was a lineal descendent of the basic research done by Brown and other earlier biologists. Penicillin was not widely deployed to combat disease and infection until World War II, however.

In the 1950's, the US Senate held investigative hearings on the question of the high costs of antibiotic drugs. The pharmaceutical manufacturers cited their research outlays as part of the justification for their price structure. By the 1960's, with many dozens of antibiotics on the retail market, the Food and Drug Administration required years of stringent testing and evaluation before a new pharmaceutical drug could be offered to the public.

It took more than a century for the quiet work of one man peering into a microscope at some Ivory Tower research laboratory to broaden into a political wrangle between giant corporations and the US Government over an industry that involves billions of dollars.

It doesn't take that long anymore.

No matter how high an Ivory Tower reaches, its base is still on the ground. No matter how esoteric a piece of research may be today, it gets enmeshed in politics almost immediately, even if only over how much of a share of the Federal research budget the work should receive.

One of the most exciting and challenging areas of basic research being conducted today is the field of molecular biology. And it is smack in the middle of a political squabble that could be literally a matter of life and death for every human being on this planet.

Molecular biologists study the basic chemical mechanisms of living cells. They have reached the point where they can actively ma-

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nipulate the DNA in the nucleus of the cell. In what they call "recombinant DNA" experiments, the molecular biologists can now get inside the nucleus and weld genes from one organism into the chromosome chain of another. Genes from frogs, mice and fruit flies have been grafted into the nuclei of bacteria; so have the genes of other bacteria, and viruses.

The molecular biologists are at a stage similar to that of nuclear physicists just before World War II started. Instead of passively studying the way atoms are constructed, the physicists began to actively tinker with atoms, take them apart and release the energies inside them. This work led to the Manhattan Project, and Hiroshima.

The molecular biologists are on the brink of a Manhattan Project of their own. They are ready to begin manipulating the DNA of bacteria in ways that could lead, eventually, to results that are much more potent than atomic power. But more than two years ago they stopped this research, voluntarily. They suspended their own work, deliberately, because the price of this new knowledge could be too brutally high for the human race to pay.

The eventual benefits of this line of research could totally transform our lives. It could lead to the elimination of genetic disorders such as diabetes and sickle-cell anemia. It could completely change the medical profession and the pharmaceutical industry, bring about a revolution in agriculture by grafting nitrogen-fixing genes onto food crops and eliminating the need for fertilizers. It could even end cancer.

But the risks are also monumental. The research could lead, by accident or design, to artificially-mutated bacteria or viruses that could create unstoppable pandemics of totally new diseases for which there are no medicines.

So the molecular biologists called for a worldwide moratorium on recombinant DNA experiments, pending the adoption of strong, effective controls that will prevent the kinds of accidents they fear. This is unprecedented in the history of scientific research. It's as if the physicists on the Manhattan Project had gone on strike in 1944, until the Government agreed not to use atomic bombs as weapons of war.

How long the molecular biologists will maintain their moratorium is a pressing question. The "strike" may be broken by political delay and argument before foolproof safeguards are put into effect in every laboratory.

The recombinant DNA experiments were not done with human cells. Human DNA is much too complex to deal with, at present. Instead the scientists have worked with the much simpler DNA of a microscopic bacterium called *Escherichia coli. E. coli's* DNA is

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about a thousand times less complex than human DNA, and this tiny bacterium has become the molecular geneticist's favorite "guinea pig."

The researchers are a long way from tailor-making bacteria that will work as tiny chemical factories and merrily produce all the insulin or fixed nitrogen that we want. Their abilities are presently limited to taking small segments of DNA and adding them to the cell of a host organism. When the two types of DNA recombine, the host organism (*E. coli*) develops new characteristics that are often unexpected and uncontrollable.

Most of these artifically-induced mutations kill the host, just as most mutations in nature are harmful and result in the organism's demise. But some of the artificial mutations "take" without damaging the host.

The big problem is that the host, *E. coli*, is an ubiquitous little bug. Strains of *E. coli* thrive in the human intestinal tract. You have millions of them inside you right now. Suppose a molecular biologist accidently produces a strain of *E. coli* that carries genes which cause tumors. If this artificially-mutated bacterial strain got outside the laboratory it could very well begin to infect people by the millions.

At this stage of the research, no one can predict just which genes will "take" to their *E. coli* hosts, and what mutations to the bacteria might be caused as a result. It will take many years of intensive experimental work before the scientists can begin to tailor their work so that they know what the end result will be before they start a particular recombination. (That would be genetic engineering, not genetic research.) Meantime, there is a slight but very real chance that dangerously mutated bacteria could escape the laboratory and cause havoc. There is also the chance that this new knowledge could be harnessed for military purposes, and germ warfare could become even more deadly than it is today.

That's why the molecular biologists called for a voluntary moratorium on this line of research more than two years ago. The National Academy of Sciences then set up a special committee to work out guidelines and safeguards for conducting recombinant DNA experiments. An international meeting was held in February 1975 at Asilomar, on the Monterey peninsula in California. It was a worldwide, all-star meeting of molecular biologists, the kind of historic gathering that will assure Asilomar a place in the history of science. Everyone was there, from Nobel Laureates such as Joshua Lederberg to a silently-observing Russian delegation.

The men and women at Asilomar worked out a set of guidelines for recombinant DNA research. The basic ideas behind these guide-

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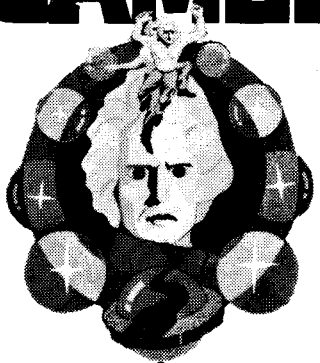
NOT TO MENTION CAMELS



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lines are two-fold: first, to provide a set of physical barriers that will prevent mutated organisms from escaping the laboratory; second, to develop "genetically enfeebled" strains of bacteria and viruses so that, if they should somehow escape, they could not survive outside the laboratory. The concept of using "enfeebled" organisms came from Dr. Sydney Brenner, of Great Britain's MRC Laboratory of Molecular Biology.

After Asilomar, the National Institute of Health set up a committee consisting of biologists, administrators and consultants. NIH is a part of the Government; the Academy of Sciences is not. NIH controls the purse strings for biological research; its word is usually law. The NIH committee adopted a set of rules in December 1975, similar to those drafted at Asilomar—but only after some rather loud arguments, usually between biologists. The suggested rules include both the physical barriers and the concept of biological containment through use of "enfeebled" microorganisms.

The physical barriers come in four graded stops, P1 through P4. P1 is simply standard microbiological lab practice. P2 sets up a few extra precautions, such as restrictions against producing aerosol sprays. P3 places the whole lab under negative air pressure, so that if

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SHADRACH IN THE FURNACE

ROBERT SILVERBERG

Part One of Three Parts.
A benevolent dictatorship can,
in theory, be the best
form of government imaginable.
But in practice,
no matter how benevolent,
it is still a dictatorship.

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It is nine minutes before sunrise in the great city of Ulan Bator, capital of the reconstituted world. For some time now Dr. Shadrach Mordecai has lain awake, restless and tense in his hammock, staring somberly at a glowing green circlet in the wall that is the shining face of his data screen. Red letters on the screen announce the new day:

Monday • 14 May • 2012

As usual Dr. Mordecai has been unable to get more than a few hours of sleep. Insomnia has plagued him all year; his wakefulness must be some kind of message from his cerebral cortex, but so far he has been unable to decipher it. Today, at least, he has some excuse for awakening early, because great challenges and tensions lie ahead. Dr. Mordecai is personal physician to Genghis II Mao IV Khan, Prince of Princes and Chairman of Chairmen—which is to say, ruler of the earth—and on this day the aged Genghis Mao is due to undergo a liver transplant, his third in seven years.

The world leader sleeps less than twenty meters away, in a suite adjoining Mordecai's. Dictator and doctor occupy residential chambers on the 75th floor of the Grand Tower of the Khan, a superb onyx-walled needle of a building that rises breathtakingly from the dusty brown Mongolian tableland. Just now Genghis Mao sleeps soundly, eyes unmoving beneath the thick lids, spine enviably relaxed, respiration slow and even, pulse steady, hormone levels rising normally. Mordecai knows all this because he carries, surgically inlaid in the flesh of his arms, thighs, and buttocks, several dozen minute perceptor nodes that constantly provide him with telemetered information on the state of Ghenghis Mao's vital signs. It took Mordecai a year of full-time training to learn to read the input, the tiny twitches and tremors and flickers and itches that are the analog-coded equivalents of the Chairman's major bodily processes, but by this time it is second nature for him to perceive and comprehend the data. A tickle here means digestive distress, a throb there means urinary sluggishness, a pricking elsewhere tells of saline imbalance. For Shadrach Mordecai it is something like living in two bodies at once, but he has grown accustomed to it. And so the Chairman's precious life is safeguarded by his vigilant physician. Genghis Mao is officially said to be eighty-seven years old and may be even older, though his body, a patchwork of artificial and transplanted organs, is as strong and responsive as that of a man of fifty. It is the Chairman's wish to postpone death until his work on earth is complete—which is to say, never to die.

How sweetly he rests now! Mordecai runs automatically through the readings again and again: respiratory, digestive, endocrine, circulatory, all the autonomic systems

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going beautifully. The Chairman, dreamless (the motionless eyes), lying as customary on his left side (faint aortal pressure), emitting gentle hhnnorrking snores (reverberations in the rib cage), obviously feels no apprehensions about the coming surgery. Mordecai envies him his calmness. Of course, organ transplants are an old story to Genghis Mao.

At the precise moment of dawn the doctor leaves his hammock, stretches, walks naked across his bedchamber's cool stone floor to the balcony, and steps outside. The air, suffused now with early blue to the east, is clear, crisp, cold, with a sharp wind blowing across the plains, a strong southerly breeze racing through Mongolia from the Great Wall toward Lake Baikal. It ruffles the black flags of Genghis Mao in Sukhe Bator Square, the capital's grand plaza, and stirs the boughs of the pink-blossomed tamarisks. Shadrach Mordecai inhales deeply and studies the remote horizon, as if looking for meaningful smoke-signals out of China. No signals come, only the little throbs and tingles of the implant disks, caroling the song of Genghis Mao's irrepressible good health.

All is quiet now. The whole city sleeps, save for those who must be awake to work; Mongols are not given to insomnia. Mordecai is, but, then, Mordecai isn't a Mongol. He is a black man, dark with an African darkness though he is no African either, slender, long-limbed, tall—some 200 centimeters in height—with dense woolly hair, large wide-set eyes, full lips, a broad though high-bridged nose. In this land of sturdy golden-skinned folk with sharp noses and glossy hair, Dr. Mordecai is a conspicuous figure, more conspicuous, perhaps, than he would like to be.

He squats, straightens, squats, straightens, jackknifing his arms out and in, out and in. He starts every morning with a calisthenic routine on the balcony, naked in the chilly air: he is thirty-six years old, and, even though his post in the government gives him guaranteed access to the Roncevic Antidote, even though he is thus spared the fear of organ-rot that obsesses most of the world's two billion inhabitants, thirty-six is nevertheless an age when one must begin conscientiously to take measures to protect the body against the normal unravelings time brings. *Mens sana in corpore sano*, yes, keep on bending and twisting, Shadrach, make the juices flow, let the old yin balance the yang. He is in perfect health and his bodily organs are the ones that were in him when he popped from the womb one frosty day in 1976. Up, down, up, down, unsparing of self. Sometimes it seems odd to him that his vigorous, violent morning exercises never awaken Genghis Mao, but of course the flow of telemetered data runs only in one direction, and as Mordecai

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puts himself through his fierce balcony workout the Chairman snores placidly on, unaware.

Eventually, panting, perspiring, shivering lightly, feeling alive and open and receptive, hardly worrying at all about the coming surgical ordeal, Mordecai decides he has had enough of a workout. He washes, dresses, punches for his customary light breakfast, and sets about his morning routine of duties.

So, then, the doctor confronts Interface Three, through which he daily enters the residential suite of his master the Khan. It is a ponderous diamond-shaped doorway, two and a half meters high. From its silken-smooth bronze surface jut a dozen and a half warty cylindrical snouts, three to nine centimeters high. Some of them are scanners and sensors, some are audio conduits, some are weapons of ineluctable lethality, and Shadrach Mordecai has no idea which is which. Most likely, what serves as a scanner today may well be a laser cannon tomorrow; with such random shifts of function does Genghis Mao contrive to confuse the faceless assassins he so vividly dreads.

"Shadrach Mordecai to serve the Khan," Mordecai says in a clear firm voice into what he hopes is today's audio pickup.

Interface Three, now emitting a gentle hum, subjects Mordecai's announcement to voiceprint analysis. At the same time Mordecai's body is being checked for thermal output, mass, postural stress, olfactory texture, and much more. If any datum should fall beyond the established Mordecai-norm, he could find himself immobilized by loops of suddenly spurting webfoam while the guards are summoned to investigate; resistance at that point might lead to his immediate destruction. Five of these interfaces protect the five entrances to Chairman Genghis Mao's chambers, and they are the wiliest doors ever devised. Daedalus himself could not have forged more clever barriers to guard King Minos.

In a microsecond Mordecai is recognized to be himself, rather than some cunning lifelike simulacrum on a kingslaying errand. With a smooth hiss of perfectly machined joints and a gentle rumble of flawless bearings the interface's outer slab glides open. This admits the doctor to a stone-walled inner holding chamber hardly larger than himself. No welcome vestibule for claustrophobes, this. Here he must halt another microsecond while the entire surveillance is repeated, and only after he passes this second muster is he allowed to enter the imperial residence proper. "Redundancy," Chairman Genghis Mao has declared, "is our main avenue of survival." Mordecai agrees. The intricate business of crossing these interfaces is a trifle to him, part of the normal order of the universe,

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no more bothersome than the need to turn a key in a lock.

The room just on the far side of Interface Three is a cavernous sphere known as Surveillance Vector One. It is, in a literal sense, Genghis Mao's window on the world. Here a dazzling array of screens, each five square meters in area, rises in overwhelming tiers from floor to ceiling, offering a constantly shifting panorama of televised images relayed from thousands of spy-eyes everywhere on the planet. No great public building is without its secret eyes; scanners look down on all major streets; a corps of government engineers is constantly employed in shifting the cameras from place to place and in installing new ones in previously unspied-upon places. Nor are all the eyes in fixed positions. So many spy-satellites streak through the nearer reaches of space that if their orbits were turned to silk they would swathe the earth in a dense cocoon. At the center of Surveillance Vector One is a grand control panel by means of which the Khan, sitting hours at a time in an elegant thronelike seat, is able to control the flow of data from all these eyes, calling in signals with quick flutters of his fingertips so that he may look at will into the doings of Tokyo and Bangkok, New York and Moscow, Buenos Aires and Cairo. So sharp is the resolution of the Khan's myriad lenses that they can show Genghis Mao the color of a man's eyes at a distance of five kilometers.

When the Chairman is not making use of Surveillance Vector One, the hundreds of screens continue to function without interruption as the master mechanism sucks in data randomly from the innumerable pickup points. Images come and go, sometimes flitting across a screen in a second or two, sometimes lingering to provide consecutive sequences many minutes in length. Shadrach Mordecai, since he must pass through this room every morning on his way to his master, has formed the habit of pausing for a few minutes to watch the gaudy, dizzying stream of pictures. Privately he refers to this daily interlude as "Checking the Trauma Ward," the Trauma Ward being Mordecai's secret name for the world in general, that great vale of sorrow and bodily corruption.

He stands in mid-room now, observing the world's griefs.

The flow is jerkier than usual today; whatever giant computer operates this system is in a twitchy mood, it seems, its commands moving restlessly from eye to eye, and pictures wink on and off in a frenzied way. Still, there are isolated flashes of clarity. A limping woebegone dog moves slowly down a dirt-choked street. A big-eyed bigbellied Negroid child stands naked in a dust-swept ravine, gnawing her thumb and crying. A sag-shouldered old woman, carrying care-

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fully wrapped bundles through the cobbled plaza of some mellow European city, gasps and clutches at her chest, letting her packages tumble as she falls. A parched Oriental-faced man with wispy white beard and tiny green skullcap emerges from a shop, coughs, and spits blood. A crowd—Mexicans? Japanese?—gathers around two boys dueling with carving knives; their arms and chests are bright with red cuts. Three children huddle on the roof of a torn-away house rushing swiftly downstream on the gray white-flecked breast of a flooding river. A hawk-faced beggar stretches forth an accusing clawlike hand. A young dark-haired woman kneels at a curb, bowed double in pain, head touching the pavement, while two small boys look on. A speeding automobile veers crazily from a highway and vanishes in a bushy gulley. Surveillance Vector One is like some vast tapestry of hundreds of compartments, each with a story to tell, a fragmentary story, tantalizing, defying comprehension. Out there in the world, out in the great big wide Trauma Ward that is the world, the two billion subjects of Genghis II Mao IV Khan are dying hour by hour, despite the best efforts of the Permanent Revolutionary Committee. Nothing new about that—everyone who ever lived was dying hour by hour all through his life—but the modes of death are different in these years following the Virus War; death seems ever so much more immediate when so many people are so conspicuously rotting within all at once; and the general decay out there is that much more poignant because there are these innumerable eyes to see it in its totality. The scanners of the Khan capture everything, making no comment, offering no judgment, merely filling these walls with a staggering, baffling portrait of the revised postwar early-twenty-first-century version of the human condition.

The room is a touchstone of character, drawing revealing responses from every viewer. To Mordecai the whirling stream of scenes is fascinating and repelling, a crazy mosaic of decomposition and defeat, courage and endurance; he loves and pities the sufferers who flash so quickly across the screens, and if he could he would embrace them all, lift that old woman to her feet, put coins in the beggar's gnarled hand, stroke that child's distended belly. But Mordecai is, by inclination and profession, a healer. To others the brutal theater that is Surveillance Vector One serves only as a reminder of their own good fortune: how wise of them it was to attain high governmental rank and steady supplies of the Roncevic Antidote, to enjoy the favor of Chairman Genghis Mao and live free of pain and hunger and organ-rot, insulated from the nightmare of real life! To oth-

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ers the screens are unbearable, arousing not a sense of smug superiority but rather a feeling of intolerable guilt that they should be here, safe, while *they* are out there. And to others the screens are merely boring: they show dramas without plot, transactions without discernible purpose, tragedies without moral significance, mere stray snatches of life's scratchy fabric. What Genghis Mao's own reactions to Surveillance Vector One may be is impossible to determine, for the Khan is, in this as in so many other things, wholly inscrutable as he manipulates the controls. But he does spend hours in there. Somehow the room feeds him.

Shadrach Mordecai takes his time this morning, giving the huge room five minutes, eight, ten. Genghis Mao still sleeps, after all. The implanted monitors tell Mordecai that. In this world no one escapes surveillance; while the many eyes of Genghis Mao scan the globe, the slumbering Khan is himself scanned by his physician. Mordecai, standing quite motionless beside the Chairman's upholstered throne, receives a flood of data within and without, Genghis Mao's metabolic output twanging and tweaking the doctor's implants, the flowing shimmer of the screens assailing his eyes. He starts to leave, but just then a screen high up and to his left shows him a glimpse of what is certainly Philadelphia, unmistakably Philadelphia, and he halts, riveted. His native city: he was a Bicentennial baby, entering the world in Ben Franklin's own town, coming forth high up in Hahnemann Hospital when the United States of America was four months short of its two hundredth birthday. And there is Philadelphia now, turning in the gyre of some ineffably keen satellite-mounted eye, the familiar childhood totems, City Hall, Independence Hall, Penn Center, Christ Church. It is years since he last was there. For a decade, now, Shadrach Mordecai has lived in Mongolia. Once it was hard for him to believe there really was such a place as Mongolia, fabled land of Prester John and Genghis Khan, but by this time it is Philadelphia that has started to seem a place of fable to him. And the United States of America? Do these syllables still have meaning? Who could imagine that the Constitution of Jefferson and Madison would be forgotten, and America pledge allegiance to a Mongol overlord? But that overstates the case: America, Mordecai knows, is governed like all other nations by a local wing of the Permanent Revolutionary Committee, that alliance of radical and reactionary groups functioning through a series of vestigial quasi-democratic institutions, and the aged recluse Genghis Mao is merely the Chairman of the Committee, a remote and semi-mythical figure who governs indirectly and has no immediate con-

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sequence in the daily lives of Dr. Mordecai's former countrymen. Probably no one in America pauses to consider Genghis Mao to be the embodiment of the authority of the Permanent Revolutionary Committee, and thus the true master of the body politic, any more than one considers the chairman of the board of the local electric company to be the source and controller of the power that flows when the switch is thrown. But he is. Not that many Americans would be disturbed to learn that they owed fealty to a Mongol. The whole world has abdicated; the game of politics is ended; Genghis Mao rules by default, rules because *no one cares,* because in an exhausted, shattered world dying of organ-rot there is general relief that someone, anyone, is willing to play the role of global dictator.

Philadelphia vanishes from the screen and is replaced by an idyllic tropical scene, pink-white half-moon beach, feathery palm-fronds, flowering hibiscus in scarlet and yellow, no people in view. Mordecai shrugs and moves on.

The imperial chambers are circular in layout, occupying the entire top story of the Grand Tower of the Khan except for the five wedge-shaped apartments, such as the one where Mordecai lives, that notch into the suite equidistantly around its rim. As the doctor crosses Surveillance Vector One he comes to three massive doorways, spaced some eight meters apart along the side of the room farthest from the interface through which he entered. The left-hand doorway leads to the bedroom of Genghis Mao, but Mordecai does not take it—best to let the Chairman have all the sleep he needs, today—nor does he choose the central doorway, which goes to the Chairman's private office. Instead he approaches the right-hand doorway, the one that opens into the room known as Committee Vector One, through which he must pass to reach his own office.

He waits briefly while the door scans and approves him. All the inner rooms of the imperial suite are divided one from another by such impermeable barriers, smaller in scope than the main doors at the five interfaces but similarly suspicious: no one is allowed to range freely here from room to room. After a moment the door grants him entry to Committee Vector One. This is a large, brightly-lit room, spherical like all the major rooms of Genghis Mao's suite. It occupies the physical center of the apartment, the locus around which all else turns, and in a less literal sense it is the nerve-center of the planetary governing structure, the Permanent Revolutionary Committee. Here, day and night, arrive urgent communiqués from Committee cadres in every city; and here, day and night, Committee potentates sit in front of intricate switchboards

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glistening with terminals, making policy and communicating it to the lesser satraps in the outer provinces. All applications for Roncevic Antidote treatments are routed through this room; all requests for organ transplants, regeneration therapy, and other vital medical services are considered in Committee Vector One; all jurisdictional disputes within the regional Committee leadership are settled here according to the principles of centripetal depolarization, Genghis Mao's chief philosophical gift to humanity. Shadrach Mordecai is not a political man and he has little concern with the events that take place in Committee Vector One, but, since the floor plan of the building requires him to cross the room many times a day, he does occasionally pause to observe the bureaucrats at their labors, the way he might stop to examine the behavior of bizarre insects in a crumbling log.

Not much seems to be going on here now. At times of high crisis all twelve of the switchboard seats are occupied, and Genghis Mao himself, seated at his own elaborate desk at the very center of everything, fiercely manipulating his formidable battery of sophisticated communications devices, directs the course of strategy. But these are quiet days. The only conspicuous crisis in the world is the one in the Chairman's liver, and that will soon be remedied. For weeks now Genghis Mao has not bothered to take up his post in Committee Vector One, preferring to discharge his sovereign responsibilities from his smaller private office adjoining his bedroom. And only three of the switchboards are in use this morning, operated by weary-looking vice-chairmen, one male and two female, who yawn and slouch as they take incoming messages and formulate appropriate replies.

Mordecai is halfway across the room and walking briskly when someone calls his name. He turns and sees Mangu, the heir-apparent to Genghis Mao, heading toward him from the direction of the Chairman's private office.

"Do they operate on the Khan today?" Mangu asks worriedly.

Mordecai says, nodding, "In about three hours."

Mangu frowns. He is a sleek, handsome young Mongol, unusually tall for his kind, nearly as tall as Mordecai himself. His face is round, his features are symmetrical and pleasing, his eyes are bright and alert. At the moment he seems tense, jangled, apprehensive.

"Will it go well, Shadrach? Are there any risks?"

"Don't worry. You won't become Khan today. It's only a liver transplant, after all."

"Only!"

"Genghis Mao's had plenty of those."

"But how much more surgery can his body stand? Genghis Mao

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is an old man, after all."

"Better not let him hear you say that!"

"He's probably listening right this minute," says Mangu casually. Some of the tension goes from him. He grins. "The Khan never takes what I say seriously, anyway. I believe he sometimes thinks I'm a bit of a fool."

Mordecai smiles guardedly. He also sometimes thinks Mangu is a bit of a fool, and perhaps more than a bit. He remembers Dr. Crowfoot of Project Avator, Nikki Crowfoot, *his* Nikki with whom he would have spent this past night but for Genghis Mao's operation, telling him months ago of the dismal fate reserved for Mangu. Mordecai knows, as Mangu almost certainly does not, that Genghis Mao plans to be his own successor, through the vehicle of Mangu's strong, healthy young body. If Project Avatar is carried to a successful conclusion, and the auguries are favorable for it, the fine sturdy figure of Mangu will indeed someday sit upon the throne of Genghis Mao, but Mangu himself won't be there to enjoy the occasion. To Mordecai, anyone who marches as blithely toward his own destruction as Mangu is doing, perceiving nothing, suspecting nothing, fearing nothing, is a fool and worse than a fool.

"Where will you be during the operation?" Mordecai asks.

Mangu gestures broadly toward the main command desk of Committee Vector One. "Over there, pretending to run the show."

"Pretending?"

"You know there are many things I still have to learn, Shadrach. I'm not going to be ready to take over for *years*. That's why I wish he wouldn't undergo all these transplants."

"He doesn't do it for the exercise," Mordecai says. "The present liver's been failing for weeks. It's got to come out. But I tell you: don't worry."

Mangu smiles and grips Mordecai's forearm for a brief, affectionate, surprisingly painful squeeze. "I won't. I have faith in you, Shadrach. In the whole medical team that keeps the Khan alive. Let me know the moment it's over, will you?"

He strides away, toward the main command post, to play at being monarch of the world.

Mordecai shakes his head. Mangu is an attractive figure, genial and charming and even charismatic. In a dark time lit only by ghastly jagged flashes of nightmare-light, Mangu is something of a popular hero. In the past ten months or so he has become the Chairman's public surrogate, appearing in Genghis Mao's place at formal functions, dam dedications and Committee congresses and the like, and the dashing, gallant prince-in-waiting, so disarming, so unpretentious, so accessible to the

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populace, is beloved in a way that Genghis Mao never has been, never for an instant. Those who have observed Mangu at close range are aware that he is essentially a hollow man, all image and no substance, shallow and plump-souled, an amiable athlete living an implausible charade, but though Mangu is trivial he is far from contemptible, and Mordecai feels genuine compassion for him. Poor Mangu, fretting over the possibility that he might succeed the Khan this day, with his apprenticeship not yet finished! Does it ever occur to Mangu that he will *never*—not in a year, not in ten years, not in a thousand—be a fit successor to Genghis Mao, that he is fundamentally incapable of wielding the terrible power which he is ostensibly being groomed to inherit? Apparently not. Or else Mangu, knowing his own limits, would have begun to wonder what plan Genghis Mao really had for him, why the Chairman had picked as his successor a mere handsome boy, his own opposite in all important respects. To train him to be supreme sovereign? No. No. To be a puppet, merely, to dance before the people and win their love. And then, one day, to have his identity scooped out and thrown away, so that his body might become a dwelling for the wily mind and dark soul of Genghis Mao, when the Chairman's own ancient patched hull can no longer be repaired. Poor deceived Mangu. Mordecai shivers.

He hurries on into his own office, closes the door, seals it.

There is a sudden sharp twanging in his left thigh, close to the hip, the place where he receives Genghis Mao's cerebral output. Four rooms away, the Khan is awakening.

Mordecai's office is an island of tranquility for him within the tumultuous intensity of life atop the Grand Tower of the Khan. The room, a sphere ten meters in diameter, has many entrances, but they are programed to open only for himself or Genghis Mao. One is the door through which he has

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just come, out of Committee Vector One. Another goes to the Khan's private dining room, and another, on the far side, to a seldom-used heavy-insulation study known as the Khan's Retreat. The last door is Interface Five, connecting the doctor's office to the two-story-high Surgery that occupies one of the five outer wedges of the tower.

In the sanctuary of his office Shadrach Mordecai enjoys a few moments of peace before proceeding on his voyage into the turmoils of the day. Though Genghis Mao is up, there is no need to hurry. Mordecai's implants tell him—by now, he can equate every trifling inner signal with some concrete aspect of the Khan's activities—that the imperial servitors have entered Genghis Mao's bedchamber, have helped the Khan to his feet, are walking him through the series of mild arm-swinging chest-stretching exercises that the old man, at Dr. Mordecai's insistence, performs every morning. Next they will bathe him, then they will shave him, finally they will dress him and bring him forth. Though there will be no breakfast for Genghis Mao today, because of the impending operation, Shadrach Mordecai has at least an hour before he must attend the Khan.

Simply being in the office buoys him. The dark, rich paneling, the subdued lighting, the curving uncluttered desk of strange exotic woods, the splendid bookcase of crystalline rods and thin travertine slabs in which he keeps his priceless library of classic medical texts, the elegant armoires that house his extensive collection of antique medical instruments—it is an ideal environment for him, a perfect enclosure for the doctor he would like to be and occasionally is able to believe he is, the master of the Hippocratic arts, the prince of healers, the preserver and prolonger of life. Not that this room is a place for the practice of medicine. The only medical tools here are ancient ones, romantic and quaint apparatus, odd beakers and scalpels and lancets, bloodletting knives and cauterizing irons, ophthalmoscopes and defibrillators, early and inaccurate anatomical models, chirurgical saws, sphygmomanometers, electrical invigorators, flasks of discredited antitoxins, trephines, microtomes, relics of more innocent times. He has acquired these things eagerly in the past five years, by way of establishing his professional kinship with the great physicians of yesterday. The books, too, rare and auspicious, landmarks of medical history, talismans of scientific progress, the *Fabrica* of Vesalius, *De Motu Cordis* of Harvey, Boerhaave's *Institutiones,* Laennec on auscultation, Beaumont on digestion, with what joy he has collected them, with what reverence he has fondled them! Not without some guilt, too, for in this battered and

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deflated era it is all too easy for those few who have power and wealth to take advantage of those who have not, and Mordecai, so close to the throne, has accumulated his treasures cheaply, catching them as they slip from the grasp of older, unluckier, perhaps more worthy possessors. Still, had these things not descended to him they might have been lost altogether in the chaos that surges freely through the world beyond the Grand Tower of the Khan.

Mordecai's actual medical work is done elsewhere, in the Surgery beyond Interface Five, which serves not only for actual surgical operations but also for any other medical attention Genghis Mao may need. Mordecai's office is a place for research and reflection only. Just to the right of his desk are keyboards, compact data terminals, giving him instant access to entire libraries of medical knowledge; he need only touch a finger to a key or even speak a coded word, cite symptomata, facies, tentative diagnosis, and back will come in neatly codified form extracts from the accumulated scientific wisdom of the eons, the relevant distillate of everything from the Smith Papyrus and Hippocrates and Galen down through the latest findings of the microbiologists and immunologists and endocrinologists who labor in the laboratories of the Khan. It is all here: encephalitis and endocarditis, gastritis and gout, nephritis, nephrosis, neuroma, nystagmus, aspergillosis and bilharzia, uremia and xanthochromia, the thousand natural shocks that flesh is heir to. Time was when doctors were shamans in feathers and paint, bravely pounding drums to frighten away frightening demons, doing solitary battle against unfathomable causes and unaccountable effects, gamely piercing veins and ventilating skulls, grubbing for roots and leaves of purely magical merit. Alone against the dark spirits of disease, no guide but one's stock of inherited supernatural lore and one's intuition. And now! Here! The answer machine! A touch of the finger and behold: etiology, pathology, symptomatology, pharmacology, contraindications, prophylaxis, prognosis, sequelae, the whole miraculous scroll of diagnosis and treatment and cure and convalescence unrolling at a command! In moments of lull Shadrach Mordecai enjoys testing his wits against the computer, setting hypothetical problems for himself, postulating symptoms and proposing diagnoses; he is eleven years out of Harvard Medical School and still a student, ever a student.

Today allows few lulls. He swings to his left and taps out the telephone number of the Surgery.

"Warhaftig," he says crisply.

A moment, and then the screen shows the flat, homely face of Nicholas Warhaftig, surgeon to the Khan, veteran of a hundred critical

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transplant operations. The camera picks up a sweeping view of the operating room behind him, boards glittering with measuring dials and control panels, the laser bank, the anesthesiologist's spidery maze of needles and tubes and pipes, and, only partly visible, the main surgical stage itself, dais and bed and lights and instruments, white linens and dazzling chrome-steel fixtures, everything awaiting the imperial patient.

"The Khan's awake," Mordecai says.

"We're on schedule, then," says Warhaftig. He is sixty years old, silver-haired, phlegmatic. He was already the supreme organ-transplant man when Shadrach Mordecai was an idol-worshipping undergraduate, and though Mordecai is technically his superior on Genghis Mao's staff now there is no doubt in either man's mind about which one of them actually holds the greater professional authority. This makes their relationship an uncomfortable one for Mordecai. Warhaftig says, "Will you get him to me by 0900 sharp?"

"I'll try."

"Try hard," Warhaftig replies dryly, mouth quirking. "We begin perfusion at 0915. The liver's still on ice, but coordinating defrost is always tricky. How's he feeling?"

"As usual. The strength of ten."

"Can you give me quick readings on blood glucose and fibrinogen production?"

"A moment," Mordecai says. Those are not factors on which he receives direct telemetering from Genghis Mao's body; but he has become skillful in deducing hundreds of the Chairman's lesser body functions from clues given by the main metabolic responses. He says shortly, "Glucose doing fine, within the expected reduced levels caused by the general hepatic necrosis. It's harder to get the fibrinogen reading, but my feeling is that all the plasma proteins are on the low side. Probably the fibrinogen not as bad as the heparin."

"And bile?"

"Off sharply since Friday. Down some more this morning. No critical breakdowns of any function yet."

"All right," Warhaftig says. He gestures brusquely to someone beyond camera range. The surgeon's hands are formidable, long and muscular, fingers like elongated pliable wands, incredible octave-devouring fingers of extraordinary power and delicacy. Shadrach Mordecai, although he is no surgeon, has strong and graceful hands himself, but the sight of Warhaftig's always makes him think of his own as coarse and stumpy, butcher-fingered hands. "We're moving well here. I'll expect you at 0900. Anything else?"

"I just wanted you to know the Khan was awake," Mordecai answers, a little sharply, and breaks the contact.

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Next he phones the Chairman's bedchamber and talks briefly with one of the Khan's valets. Yes, Genghis Mao is awake, he has bathed, he is readying himself for the operation. He will begin his morning meditation in a moment. Does the doctor wish to speak with the Khan before that? The doctor does. The screen goes blank and there is a lengthy pause, during which Mordecai feels his adrenalin levels beginning to rise: not yet, not even after all this time, has the fear and awe that Genghis Mao inspires in him begun to ebb. He forces himself into calmness with a quick centering exercise, and none too soon, for abruptly the head and shoulders of Genghis II Mao IV Khan appear on the telephone screen.

The Chairman is a lean, leathery-looking man with a narrow triangular skull, powerful cheekbones, heavy brows, fierce eyes, thin harsh lips. His skin is more brown than yellow in tone; his hair is thick, black, combed back straight from his forehead and descending almost to his shoulders. His face is one that readily and obviously evokes dread, but also, oddly, trust; he seems omniperceptive and omnicompetent, a man to whom all the burdens of the world can be given and who will uncomplainingly and effectually assume them. The recent deterioration of his current liver has had visible effect on him—a bronzing of his skin beyond its normal deep hue, some blotches of pigment on his cheeks, an uncharacteristic feverish brightness of the eyes—but still he seems a man of regal bearing and inexhaustible strength, a man designed by nature to endure and to rule.

"Shadrach," he says. His voice is deep, grating, with a narrow dynamic range, not really a good demagogue's voice. "How am I this morning?"

It is an old joke between them. The Khan laughs; Mordecai manages a bilious smile.

The doctor replies, "Strong, well rested, a little low on blood sugar but everything generally as expected. Warhaftig is waiting for you. He'd like you in the Surgery by 0900. Mangu's at the Committee Vector One desk. It's a quiet day so far."

"This will be my fourth liver, Shadrach."

"Your third, sir," Mordecai says gently. "I've been over the records. First transplant in 2005, the second in 2010, and now—"

"I was born with one also, Shadrach. We should count that. I'm human, eh, Shadrach? We mustn't forget the set of organs I was born with." Genghis Mao's inescapable eyes pierce the uneasy Mordecai. Human, yes, one must always try to keep that in mind, the Chairman is human, though his pancreas is a tiny plastic disk and his heart is constantly spurred by electric jolts delivered through fine silver nee-

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dles and his kidneys were grown in bodies other than his own and his spleen his lungs his corneas his colon his esophagus his pharynx his thymus his pulmonary artery his stomach his yes oh yes human he is human but sometimes it is hard to remember that—and sometimes, looking into those irresistible terrifying glacial eyes, one sees not the godlike flash of supreme authority, but something else, an opaque look of fatigue or perhaps terror, a look that seems at once to reveal an overwhelming fear of death and to offer warm welcome to it. Genghis Mao is death-haunted, certainly, a man whose grasp on life is so ferocious after nine decades that he will submit to any bodily torment in order to buy another month, another year; he lives in morbid dread of death and his eyes proclaim it; but he is death-loving, too, obsessed with the termination that he constantly postpones, so much so as a man who is obsessed with the orgasm he strives so fiercely to delay. Mordecai has heard Genghis Mao speak of *the purity of not-being.* Not for him the coming of *süsser Tod,* no, never, and yet how he savors the tempting sweetness of it even as he averts his lips from it. Mordecai suspects that only such a man, death-haunted, death-obsessed, would want to make himself master of the sort of place this world has become. But how can Genghis Mao, brooding dreamily on the delicate beauties of death, nevertheless also yearn to live forever?

"Come for me at 0900," the Chairman tells him.

Mordecai nods to a dead screen.

In the time remaining before he must go to fetch the Khan, Shadrach Mordecai discharges one of his regular bureaucratic responsibilities: receiving the daily progress reports from the directors of the three great research schemes in which Genghis Mao has much of the resources of the government mobilized, Project Talos, Project Phoenix, and Project Avatar. As Genghis Mao's physician, Shadrach is ex-officio head of all three projects, and he confers each morning with the project leaders, whose laboratories are located in the lower levels of the Grand Tower of the Khan.

Katya Lindman of Project Talos comes on screen first. "We coded the eyelids yesterday," she tells him at once. "It's one of the biggest steps so far in our analog-to-digital conversion program. As of now we have seven of Genghis Mao's 300 basic kinesic traits fully graphed and equivalented." She is a short, wide-shouldered woman, a Swede, formidably intelligent, dark-haired and easily angered, a woman of considerable beauty despite or perhaps because of her thin-lipped, sharp-toothed, oddly feral and menacing mouth. Her project is the

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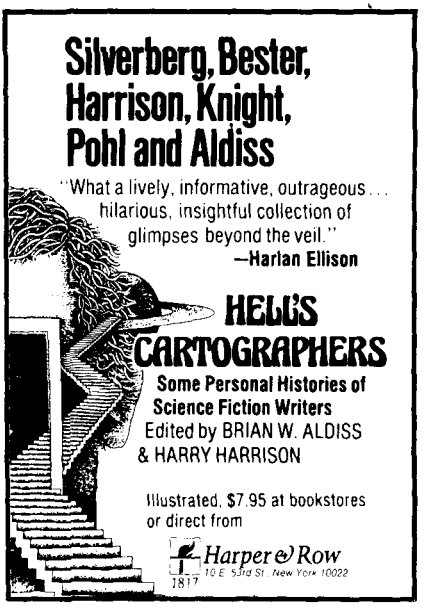
most far-fetched of the three, an attempt to develop a mechanical Genghis Mao, an analog-entity through which he can continue to rule after bodily death—a puppet, a simulacrum, but one with a sustaining Genghis Mao-like life of its own. The technology for building such an automaton already exists, of course; the problem is to create something that transcends the Walt Disney robots that Mordecai remembers from his youth, the cunning Abe Lincoln and Thomas Edison and Christopher Columbus machines, so lifelike in their skin tones and movements and manner of speaking. Disney machines are not sufficient to the present need. A Disneyed Abe Lincoln can deliver the Gettysburg Address flawlessly, eight times an hour, but it would never be able to deal with a delegation of angry Reconstructionist Congressmen, and a Genghis Mao of metal and plastic might spout the tenets of centripetal depolarization with hypnotic eloquence but what value would that be in meeting the crises of a constantly changing, challenging society? No, they must capture the essence of the living Genghis Mao, code it, make from it a program that will continue to grow and react. Shadrach Mordecai is skeptical of success. He asks Katya Lindman, as he does every few weeks, how her department is coming on the task of digitalizing Genghis Mao's mental processes, which is rather more difficult than working out digital programs for his facial expressions and habits of posture. The question is threatening to her, and her eyes briefly flash with familiar fire; but all she says is, "We continue to attack the problem. Our best people are constantly at work on it."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"Thank you," Shadrach says, and switches to Irayne Sarafrazi's channel. The head of Project Phoenix is a young Persian gerontologist, a slight, almost fragile-looking person, with huge dark eyes, full solemn lips, black hair pulled back starkly from her forehead. Her group seeks a body-renewal technique that will allow rejuvenation of the living cellular matter of Genghis Mao, so that he may be re-

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born in his own skin when he no longer has the strength and resilience to accept further organ transplants. The prime obstacle here is the unwillingness of the brain to regenerate the cells it daily sloughs off; reversing the decline of the other organs and making them young again is a relatively simple matter of nucleic-acid reprogramming, but no one has found a way to halt, let alone to recoup, the constant death of the brain. Already in Genghis Mao's long life the estimated weight of his brain has declined by ten percent, with a corresponding loss in mnemonic function and neural response time; nevertheless he is far from senile, but what hideous decline into idiocy might not overtake him if he were given a further century or two of residence in his present cerebrocerebellar equipment? Hundreds of hapless primates have surrendered their cranial contents to Irayne Sarafrazi's research, and their brains live in bell-jars on her laboratory benches, alive and responsive while she seeks ways of tickling their neurons into new growth, but no progress has been made. This morning she seems discouraged. Her glittering Achaemenid eyes look dull and strained. The disembodied brain of Pan, a chimpanzee, has suddenly undergone a fatal deterioration, just when it appeared that some actual cellular growth was beginning. "We're about to begin the autopsy," Irayne Sarafrazi says dismally, "but we think Pan's death may mean our whole cerebral stimulation program is a mistake. I'm thinking of switching our emphasis away from actual brain regeneration toward redundancy activation. What do you think, Shadrach?" Mordecai shrugs. Of course he knows that the human brain has vast redundant areas, billions of cells whose only apparent function is to be an emergency reserve; he knows, too, what has been accomplished by way of rehabilitating the victims of strokes and other cerebral damage through redirecting the neural channels into the redundant areas. But more efficient utilization of existing brain tissue only delays, does not remove, the threat of senile degeneracy. So long as cells daily die, Genghis Mao will tumble eventually into senility in his rejuvenated body, fifty or seventy or ninety years from now, a drooling Struldbrug of the mind trapped in a sturdy requickened frame. "Redundancy is a short-term measure," Shadrach tells her. "Without brain regeneration, the risks are too high. An old brain in a young body won't work. Let me see the autopsy report on the chimp tomorrow and maybe I'll have some ideas." Unable to bear the sight of her stricken face, he tunes Sarafrazi out and gets Nikki Crowfoot of Project Avatar on his screen.

She smiles tenderly. "Did you sleep well, Shadrach?"

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Her strength, and the strength of her concern for him, radiate glowingly from the screen. She is a stalwart woman, an athlete, a huntress, tawny-skinned, big-breasted, nearly 190 centimeters tall, with a strong heavy-boned face, wide-set eyes, wide-lipped mouth, assertive high-bridged nose. Her parents on both sides were Amerindians, Navajo mother, detribalized Assiniboin father. She and Shadrach Mordecai have been lovers for four months, friends for more than a year. Mordecai hopes Genghis Mao knows nothing of their affair, but he suspects it is a naive hope.

He says, "I slept well for a while, anyway."

"Worrying about the Chairman's operation?"

"I suppose. Or maybe just worrying in general."

"I could have helped you relax," she says, with a sly grin.

"Probably you could. But I've always abstained the night before the Chairman undergoes surgery. Like a prizefighter, like an opera singer. To keep the concentration absolutely clear, the mind unblurred. I know it's silly, Nikki, but it's something I do."

"All right. All right. I was only teasing. Anyway, we can make up for it tonight."

"Tonight, yes. Or this afternoon. We'll have him off the table by 0230 hours. How would you like to take the tunnel to Karakorum with me?"

Nikki Crowfoot sighs. "Can't. Don't tempt me. Critical tests this afternoon. Do you want to hear my report?"

Dr. Crowfoot's work overlaps, in some respects, both of the other projects, for Project Avatar's goal is to develop a personality-transfer technique that will permit Genghis Mao—his soul, his spirit, his persona, his anima, but no actual physical part of him—to move to another, younger body. Like Project Talos, Avatar strives to reduce the patterns of Genghis Mao's mental responses to digital—therefore programmable, therefore reproducible—codings; like Project Phoenix, Avatar intends to give the Chairman a new and healthy body in which to dwell. But where Talos would house the digital-coded analog of Genghis Mao in a mechanical construct, Avatar would use a real body of flesh and blood; and where Phoenix would give the Chairman new vitality by rejuvenating his own body, Avatar would place him in one formerly inhabited by someone else, specifically Mangu. On the one hand Crowfoot's project would avoid the inhumanity of creating a robot Khan, on the other it would sidestep the problem of brain cell deterioration by instilling the intangible and abstract essence of Genghis Mao in a young and vigorous brain. Despite the areas of overlap, the three projects conduct their research altogether independent of

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one another, and no attempts are made at exchanges of ideas. Redundancy, after all, is our main avenue to survival.

Shadrach Mordecai, because he is privy to the work of all three, is perhaps the only one who really knows where they stand in relation to one another. He knows that Katya Lindman's team is attempting something that is probably hopeless—instilling the soul of a man into a machine will not produce a convincing and politically viable duplicate of the original, machines ordinarily being incapable of transcending their machinehood—and that Irayne Sarafrazi's group, though it is pursuing the most plausible route toward giving Genghis Mao the eternal life he hungers for, is destined to be blocked by the apparently insoluble brain-decay difficulty. He knows, too, that Nikki Crowfoot's approach to personality-coding has been more fruitful than Lindman's, and that in a matter of months it may be possible for the scientists of Project Avatar to infuse the essence of Genghis Mao like a pervasive coating of paint over the mind of a donor body whose previous occupant has been obliterated by electroencephalographic mindpick techniques. Poor Mangu. Poor hopeful tragic princeling, destined to be nothing better than a *tabula rasa* for the Khan.

Mangu's fate will not be long delayed. Mordecai listens in chilly fascination to Nikki's recitation of the latest wonders. They have reached the stage where they can code the souls of animals, abstracting from them the unique electrical patterns of their minds, transforming those wave forms into numbers, using the numbers to replicate the electrical patterns within the brains of donor beasts. They have coded a rooster and pumped its soul into a mindpicked hawk; hawk no longer flies, but runs cockadoodling around the chicken coop, clumsily fluttering its magnificent wings and crazily mounting the terrified hens. They have coded a gibbon and housed its mind in a gorilla's body; gorilla has turned berserkly arboreal, brachiating in wild desperation through the treetops, while its evicted gorilla-essence now resides within a former gibbon that struts ponderously at ground level, leaning on its flexed knuckles and pausing occasionally to pound its scrawny chest. And so on, and so on; they are getting ready to attempt the first human transfers, within a matter of weeks. Mordecai does not ask Crowfoot where she intends to obtain her experimental subjects. There are confusing problems of ethics as it is in this whole business of serving Genghis Mao; he would rather not load his conscience with his beloved's deeds.

"Call me when the operation's over," Nikki Crowfoot tells him.

"But won't that interrupt your

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critical tests, Nikki?"

"Not critically. Call me. I'll see you tonight."

"Tonight, yes," Shadrach says faintly. The time is 0855 hours. He must convey Genghis Mao now to the Surgery.

The liver, the body's largest gland, is a useful and complex organ weighing a kilogram and a half—about two percent of the total body weight—that performs hundreds of significant biochemical functions. The liver produces bile, a green liquid essential to digestion. Through the liver passes exhausted venous blood en route to the heart, blood which the liver filters to remove bacteria, poisons, drugs, and other noxious impurities. To the blood the liver adds the plasma proteins it manufactures, among them the clotting agent fibrinogen and the anticoagulant heparin. From the blood the liver takes sugar, which it converts to glycogen and stores until the body's energy needs require it. The liver is responsible also for the conversion of fats and proteins into carbohydrates, the storage of fat-soluble vitamins, the manufacture of antibodies, the destruction of outworn red blood cells, and much else.

So many metabolic purposes does the liver serve that no vertebrate can survive more than a few hours without one. So central is it to life that it has extraordinary regenerative powers: if three-quarters of the liver is removed, the remaining cells will multiply so rapidly that the gland will regain its original dimensions within two months. Even if ninety percent of the liver is destroyed, it continues to produce bile at the normal rate. Redundancy is our main avenue of survival. Nevertheless the liver is subject to many disfunctions—the various jaundices, the various necroses, septicemia, dysenteric abscesses, cancer of the bile passages, and so forth. The liver's totipotence enables it to withstand such disfunctions for prolonged periods, but its powers of recuperation diminish, like most other things, with age.

Genghis Mao suffers from chronic liver trouble. To sustain his life and the life of the assorted artificial and transplanted organs within him, the Chairman must pour oceans of medication through his system each day, and even the most durable of livers would be hard pressed to handle the constant assault of high-powered chemicals it is asked to filter from Genghis Mao's bloodstream. Then, too, the presence of so many alien organs sets up biochemical interaction phenomena within the body that the liver must counteract, and the strain is telling. The Chairman's beleaguered liver is in a perpetually morbid state, aggravated by his

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great age and the unnatural intricacy of his composite internal structure, and periodically it must be replaced. That time has again come.

Two burly aides lift Genghis Mao's short, slight figure onto a gurney and the familiar trip from the imperial bedchamber to the operating table commences. The Khan is cheerful, feverish and frail and beady-eyed though he looks; he nods and winks to the aides as they position him, telling them that he is comfortable; he chuckles, he even essays a quip or two. Mordecai is astounded, as always, by the Khan's incredible calmness at such a moment, as evidenced by the telemetered data reaching his implanted sensors. Surely Genghis Mao knows that there is a significant chance of his dying during the operation, but his somatic output registers no apparent awareness of that—as though the Chairman's spirit is so neatly balanced between love of life and hunger for death that it floats in perfect metabolic equilibrium. At any rate Shadrach is much less relaxed than his employer, perhaps because he regards the risks of a liver transplant operation as distinctly nontrivial and is far from ready to confront the personal uncertainties of a post-Genghis Mao world.

On silent pneumatic treads the gurney bearing the Chairman glides from the imperial bedchamber to the imperial office, thence via the private dining room into Shadrach Mordecai's office, and—after an eternity of suspicious scanning—through Interface Five into the Surgery. This is a magnificent tetrahredal enclosure extending through the uppermost two stories of the Grand Tower of the Khan and subtending some thirty degrees of arc along the skin of the elongated conical building. A cruciform cluster of chromed fixtures at the room's summit floods it with brilliant but not glaring light. A platform midway between floor and ceiling juts from the wall opposite the interface, dividing the great room almost in half on its far side, and atop this platform rests the dazzling aseptic transparent bubble within which the actual surgery is performed; beneath the platform that supports the bubble is the surgical stage's environment-support apparatus, a huge sinister hooded cube of dull green metal housing what Mordecai imagines to be pumps, filters, heating ducts, reservoirs of sterilizing chemicals, humidifiers, and other equipment. On the other side of the room is a ziggurat of supplementary machinery rising step by step on smooth blue-green benches for some thirty meters—a squat brick-colored power unit at the bottom, an array of metering devices, an autoclave, a laser bank, the anesthesia console, a camera boom and associated playback screens to enable consulting doctors to follow the events inside

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the bubble, and much other material, some of it wholly baffling to Mordecai.

He does not need to understand what functions all this equipment serve. He will perform no actual surgery. His role in the operation is as part of the auxiliary equipment—for, with his capability to monitor, evaluate, and report on the moment-by-moment physiological changes within Genghis Mao's body, he is a kind of super-computer, far more supple and perceptive than any medical machine could be. The Chairman's condition will, of course, be monitored by the usual machinery as well (redundancy is our main avenue . . .) but Shadrach, standing at Warhaftig's elbow and receiving direct bulletins from the Khan's interior, will be able to interpret and recommend with an intuitive and deductive wisdom that no machine could attempt. He is neither flattered nor insulted by his function as a supercomputer: it is merely what he is here to do.

The gurney waddles onto the operating stage and positions itself next to the table. The table's own octopuslike power-driven glittering steel arms, extending telescopically, embrace Genghis Mao, lift him, and make the transfer; the gurney marches away. Mordecai, Warhaftig, and Warhaftig's two assistants, all properly scrubbed and gowned, enter the aseptic bubble; it is sealed behind them and will not open again until the operation is over. Now a soft hissing: the atmosphere of the bubble is being withdrawn and replaced by a surgically clean environment.

Genghis Mao, prostrate but still conscious and in high spirits, darts bright, keen glances everywhere, alertly observing each phase of the preparations. The assistants lay bare the Chairman's small hard torso—Genghis Mao is light-framed but muscular, with little subcutaneous fat and sparse body hair; the fine scars of innumerable operations crisscross his yellow-bronze skin—and begin the laborious process of connecting the terminals of the monitoring devices. Warhaftig thoughtfully palpates the Khan's abdomen and adjusts the cutting angle of the surgical laser. The anesthesiologist, whose post is outside the bubble, runs off preliminary acupuncture combinations on his keyboard. "Hook up the perfusion," Warhaftig mutters absently to Shadrach Mordecai, who is pleased to have something to do.

Since Genghis Mao will be liverless for four to six hours, an artificial liver must be used to sustain him during the operation. But no wholly artificial liver has ever been perfected, not even now, after more than fifty years of organ-transplant technology. The squat cubical device Warhaftig employs is a mechano-organic composite: pipes, tubes, pumps, and electrodialytic filters keep the patient's blood

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properly pure, but the basic biochemical functions of the liver, having thus far proven impossible to duplicate mechanically, are performed by the naked liver of a dog, resting in a bath of warm fluid at the core of the apparatus. Mordecai deftly slides two needles into Genghis Mao's upper arm, one tapping a vein, the other entering an artery. The arterial line seems to encounter some resistance and Shadrach hesitates. The Chairman winks. This is old stuff to him. "Go ahead," he murmurs. "I'm all right." Mordecai completes the hookup and nods to an assistant. Shortly the Chairman's blood is traveling toward the dialyzing coils, perfusing thereafter through the moist red lobes of the canine liver, and returning to the Chairman's body. Shadrach keeps careful check on Genghis Mao's telemeter reports: fine, fine, everything fine.

"Immunosuppressives," Warhaftig orders.

For several weeks, in anticipation of the operation, Mordecai has been dosing the Khan with antimetabolitic drugs, gradually raising the level in order to damp out Genghis Mao's normal graft-rejecting immune response. By now the Khan's antigenic structure has been so weakened that the chance of a graft rejection is slight, but no risks will be run: Ghenghis Mao receives a last jolt of antimetabolites now, as well as a dose of corticosteroids, and an aide outside the bubble activates a node that will irradiate the blood passing through the liver-surrogate, thus destroying the rejection-inducing lymphocyte corpuscles. Redundancy, redundancy, ever redundancy! The Khan's heart beats strongly. Everything is at normal throb. Mordecai perceives: blood pressure, pulse, body temperature, peristaltic rhythm, muscle tonus, pupil dilation, muscular reflexes.

"Anesthesia," Warhaftig says.

The anesthesiologist, perched high on the far wall at the keyboard of an instrument more complicated than a concert synthesizer, begins his virtuoso performance. A touch of his sensitive fingertips and the shining retractible claws of the operating table unfold and hover over the Chairman's body. The anesthesiologist seeks the acupuncture points, maneuvering the claws into place by remote control, probing with little sonic blurts until he finds the precise conduits of neural energy; when he has arranged his metal fingers to his satisfaction, he activates the ultrasonic generators and beams of sonic force rush from the hovering fingers into the Khan's relaxed motionless body. No acupuncture needles penetrate Genghis Mao, merely a laminar flow of high-frequency sound entering the acupuncture meridians. Warhaftig, using epidermal electrodes, tests the Khan's reactions, confers with the anesthesiologist, tests again, asks Mordecai for a

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reading, runs a deeper test, gets no wince of pain from Genghis Mao. The steel digits of the sonipuncture equipment sparkle in the bright light of the operating chamber; they surround Genghis Mao like the bristly organs of insects, palps or stings or ovipositors. Genghis Mao never permits a general anesthetic to be administered to him—loss of consciousness is too much like death—and Warhaftig dislikes all chemical anesthetics, general or local, so sonipuncture is the method of choice both for doctor and for patient. Fully conscious still, terrifyingly alert, Genghis Mao offers reports on his deepening loss of sensation. At last Warhaftig and the anesthesiologist deem the process complete.

"We begin now," the surgeon declares.

There is a momentary dip in the illumination as all surgical devices and support systems are activated at once. Mordecai imagines a throbbing passing through the entire building under the sudden power demand. To the left of the operating table is the perfusion machine, quietly pumping blood from Genghis Mao and forcing it through the dialysis coils. To the right waits the new liver, which has been stored in an iced saline solution since its removal from the donor and now is being bathed by warm fluids bringing it to body temperature. Warhaftig checks his laser bank one last time and, with a quick jab of a long bony finger against the control stud, causes a flash of dazzling purple light to leap forth and cut a thin red incision in Genghis Mao's abdomen. The Khan remains entirely motionless. The surgeon glances at Shadrach, who says, "All systems placid. Keep going."

Deftly Warhaftig slices deeper. As he makes each cut, scanners record the epidermal stratifications down to the cellular level, so that all joins will be perfect when the abdominal cavity is resealed. Bright steel retractors move automatically into place to hold the widening incision. The Khan watches the early phases with deep fascination, but, as his internal organs are laid bare, he turns his head away and stares toward the domed ceiling. Perhaps he finds the sight of his viscera frightening or repellent, Mordecai thinks, but more likely the Chairman is merely bored with them, having been cut open so many times.

Now the dark diseased liver is visible, heavy, spongy, sullen in color. Warhaftig, fingers moving like unerring spindles, clamps the arteries and veins connected to it. With quick daredevil flicks of his laser-scalpel he severs the portal vein, the hepatic artery, the inferior vena cava, the ligamentum teres, and the bile duct. "Done," he murmurs, and Genghis Mao's third liver is lifted from his abdomen. Away for biopsy; the fourth waits

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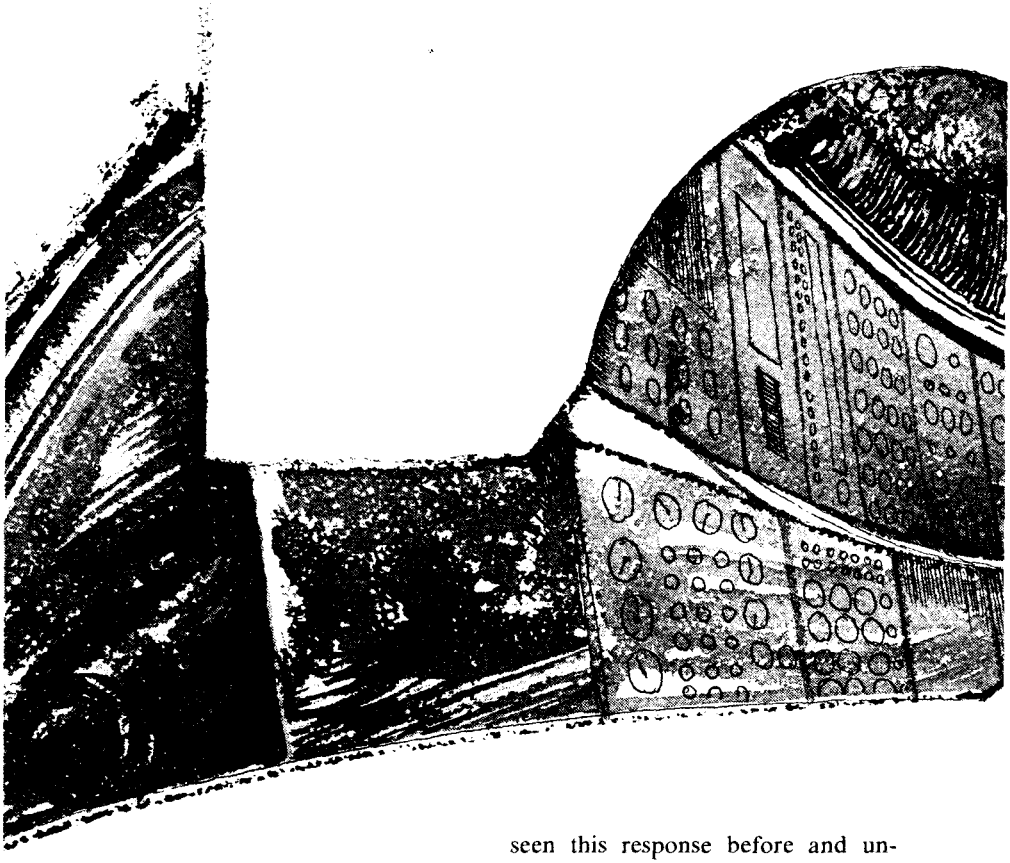

close by, large and plump and healthy, resting within a crystalline jewel-case.

The surgeon and his team commence the most taxing part of the operation. Any pigsticker can make an incision, but only an artist can execute perfect sutures. Warhaftig seals flesh to flesh with a different laser, one that welds rather than cuts. Slowly, showing no sign of fatigue, he connects the closed-off arteries, veins, and bile duct to the new liver. Genghis Mao is limp, almost comatose now, eyes glazed, lips slack: Shadrach Mordecai has seen this response before and understands it well. It is a sign neither of exhaustion nor of shock. It is no more than a kind of yogic exercise by which the Chairman disassociates himself from the boredom of his long ordeal. His vital signs are still high, with a preponderance of alpha rhythms in the cerebral output. Warhaftig toils on. The liver has been installed. The Khan's pulse rate rises and corrective measures must be taken, but this is to be expected; no cause for alarm. Meticulously Warhaftig rejoins peritoneum and muscular layers and dermis and epidermis, collaborating in this process with the

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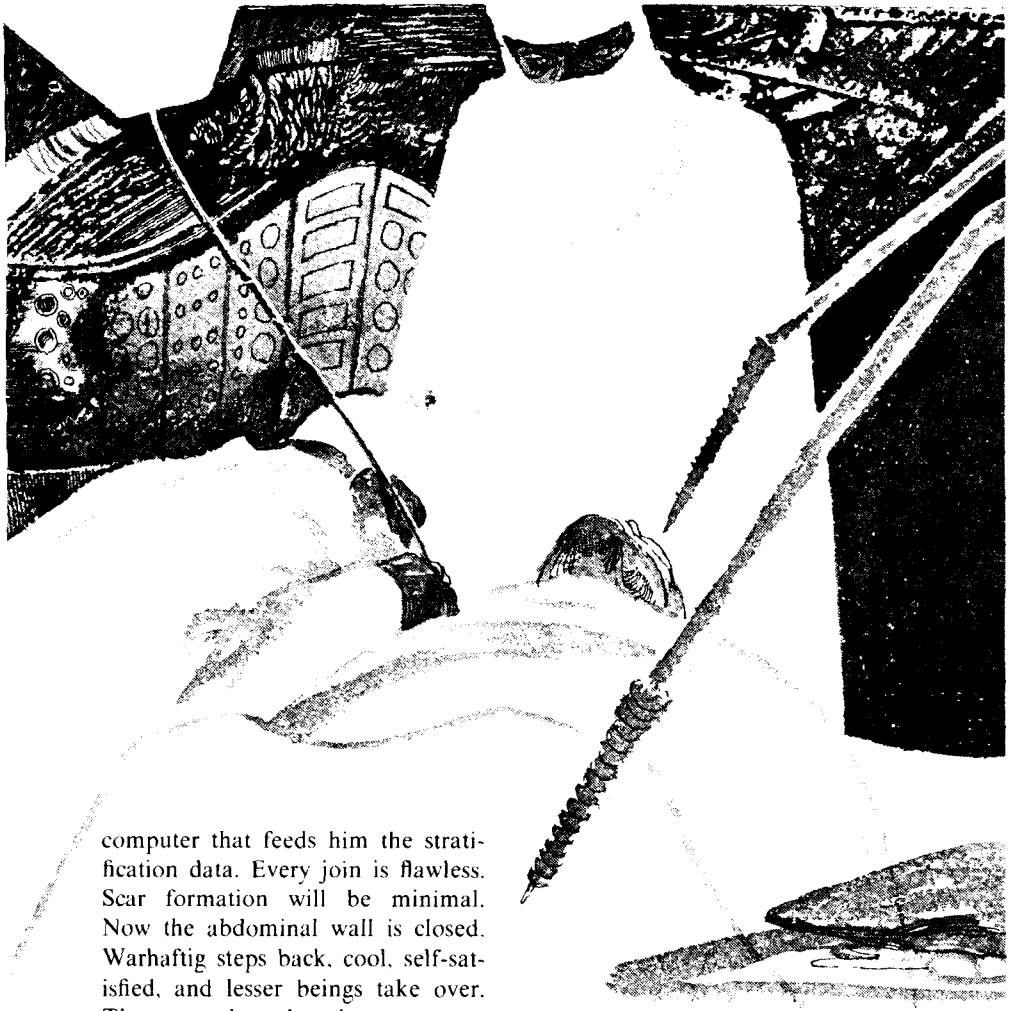

computer that feeds him the stratification data. Every join is flawless. Scar formation will be minimal. Now the abdominal wall is closed. Warhaftig steps back, cool, self-satisfied, and lesser beings take over. The transplant has been accomplished in exactly five hours. Mordecai leans forward to study Genghis Mao's face. The Chairman sleeps, so it would seem, facial muscles relaxed, eyes quiescent, chest rising and falling evenly, but no, but no, the mere shadow of Shadrach seems to register on the

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Khan's consciousness, for his thin lips pull back in a frosty smile, his left eye opens and performs an unmistakable wink.

"Well, that's another one over with," Ghenghis Mao says, his voice firm and clear.

And so, in early evening, the day's work done and his Hippocratic responsibilities well discharged, it is off to Karakorum, the playground of this weary world's ruling class, for Shadrach Mordecai, with Nikki Crowfoot as his playmate.

He picks her up three hours after the operation in the Project Avatar laboratory on the seventh level of the Grand Tower of the Khan. A great green-walled barn of a place it is, experimental animals caged everywhere, crazy animals, cockadoodling hawks and tree-climbing gorillas, and colossal banks of testing equipment wherever there are no cages. There is a laboratory stink to the air down here, a stink Mordecai remembers well from his Harvard Med days, a mix of lysol and formaldehyde and ethyl alcohol and mouse-shit and Bunsen-burner fumes and burned insulation and what-all else. Most of the Avatar staff has left for the day, but Crowfoot, in gray lab smock and battered sandals, is busy at a five-meter-high agglomeration of computers and playback heads and television screens when he comes in. She stands with her back to the door, watching pyrotechnic bursts of green, blue, and red erupt and wiggle wildly across the face of a gigantic oscilloscope. Shadrach slips up behind her and slides his hands under her arms. Her back goes rigid at the first touch of his fingers, but then she relaxes immediately, and does not turn around.

"Idiot," she says, but there is only affection in her voice. "Don't distract me. I'm running a triple simulation. That's a real Genghis Mao tape down there, the green, and the blue above it is our April 7 persona-construct, and—"

"Forget it. Genghis Mao died on the table when we pulled his liver out. The revolution started an hour ago. The city—"

She squirms in his embrace, pulling around, staring wide-eyed at him, aghast.

"—is in flames, and if you listen you can hear the explosions where they're blowing up the statues—"

She sees his expression and begins to laugh. "Idiot! *Idiot!*"

"Actually, he's doing fine, even though Warhaftig put the new liver in upside down."

"Stop it, Shadrach."

"All right. He really is in good shape. He took ten minutes off to recuperate and now he's leading Mongol-style square-dancing in Committee Vector One."

"Shadrach—"

"I can't help it. I'm in my post-operative manic phase."

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"Well, I'm not. It's been a garbage day here." Indeed her depression is obvious, once he slows down long enough to perceive it: her eyes are strained, her face is tense, her shoulders are uncharacteristically slumped.

"Your tests come out bad?"

"We blew them altogether. Hit a feedback loop and wiped three key tapes before we knew what was happening. I'm trying to salvage what's left. We've been set back a month, a month and a half."

"Poor Nikki. Is there any way I can help?"

"Just get me out of here," she says. "Amuse me. Distract me. Make funny faces. How *did* the operation go?"

"Flawless. Warhaftig's a wizard. He could do a nuclear implant on an amoeba with his thumbs and bring it off."

"The great man rests well?"

"Beautifully," Mordecai says. "It's almost obscene, the way an 87-year-old man bounces back from major surgery like this every five or six weeks."

"Is that what he is, 87?"

Shadrach shrugs. "That's what the official figure is. There are stories that he's older, perhaps a lot older, 90, 95, even past 100, they say. Rumors that he served in World War II. What we're talking about, of course, is the brain, the epidermal integument, and the skeletal structure. The rest of him's been cobbled together relatively recently out of fresh parts. A lung here, a kidney there, dácron arteries, ceramic hip joints, a plastic esophagus, a molybdenum-chromium shoulder, a new liver every few years—how it all hangs together I don't know. But he just gets younger and younger, stronger and stronger, wilier and wilier. You ought to hear his vital signs ticking away in here."

Grinning, Nikki Crowfoot puts her hands to Shadrach's thighs as though to feel the sensor implants. "Ye-es. He's doing marvelously well for his age. At the moment he's fornicating a nurse. How is Genghis Mao's sex life, anyway?"

"I try not to ask."

"Doesn't your inner machinery tell you?"

"Honi soit qui mal y pense," Mordecai says. "Doubtless he's got a splendid sex life. Probably more active than mine."

"You didn't *have* to sleep alone last night."

"My vocation demanded it of me." He gestures toward the door. "Karakorum?"

"Karakorum, yes. But first I need to wash and change."

They go to her apartment, forty stories higher in the building. All important members of Genghis Mao's staff have lodgings in the tower; but a research-group director has far less prestige than the Chairman's personal physician, and Crowfoot's suite is not nearly as opulent as Shadrach Mordecai's.

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just three rooms, plain furnishings, floors of common wood, no balcony, a sliver of a view. Shadrach settles into a webfoam lounger while Nikki strips and heads for the shower. Her bare body is strikingly beautiful, and desire stirs in him at the sight of her. She is long and lean, with strong shoulders, a narrow waist, sudden flaring hips; a dense flood of thick black hair descends to the middle of her back. Unclothed she sheds the laboratory aura, the tense and fatigued look of the dissatisfied scientist, and becomes something primitive, barbaric, primordial—Pocahontas, Sacajawea, moon-begotten Nokomis. Once when he made such feverish comparisons when they were in bed together she became embarrassed and self-conscious, and mockingly, defensively, called him Othello and Ras Tafari and Chaka Zulu; never again has he overtly romanticized her savage ancestry, for he does not like to be twitted about his own, but the feeling persists, whenever she bares herself to him, that she is a princess of a fallen nation, high priestess of the great plains, red Amazon of the pagan night.

She emerges and dons a floor-length robe of openwork golden mesh, blatantly provocative, the antithesis of her epicene lab smock. He would gladly bed her this moment, but he knows she is tired and hungry, still preoccupied with the failures of the day, not yet at all in the mood for making love, and in any case she usually dislikes afternoon couplings, preferring to let erotic tensions build through the evening. So he contents himself with a light playful kiss and an appreciative smile, and out they go, down to the depths of the tower, to the loading ramp of the Karakorum tube-train.

Karakorum lies 400 kilometers west of Ulan Bator. Five years ago a nuclear-powered subterrene drilled a wide tunnel connecting the two cities beneath the Central Gobi, its invincible thermal-stress penetrator slicing serenely through the resistant deep-lying Paleozoic granites and schists. Now high-speed trains on silent inertialess tracks sweep between the ancient capital and the modern one, making the journey in less than an hour. Shadrach Mordecai and Nikki Crowfoot join the pleasure-bound throngs on the platform; the next train is due to depart in just a few minutes. Several people greet them but no one comes close. There is something formidable and intimidating about a truly impressive-looking couple, something that seals them within a zone of chilly unapproachability, and Shadrach knows he and Nikki are impressive, tall slender black man and tall sturdy copper-skinned woman, handsome of form and face, elegantly dressed, Othello and Pocahontas out for a night on the town. But there is another isolating factor

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at work, Dr. Mordecai's professional proximity to the Khan: these people are aware that he has face-to-face access to Genghis Mao, one of the very few, and some of the Chairman's aura has been transferred to him, a contagion of awesomeness, making Mordecai one not to be approached casually. He dislikes this but there is little he can do about it.

The tube-train pulls in. Off now to Karakorum go Shadrach and Nikki.

Karakorum. Founded eight hundred years ago by Genghis Khan. Transformed into a majestic capital by Genghis' son Ogodai. Abandoned a generation later by Genghis' grandson Kublai, who preferred to rule from Cambaluc in China. Destroyed by Kublai Khan when his rebellious younger brother attempted to make it the seat of his revolt. Rebuilt eventually, abandoned again, allowed to fall into decay, forgotten entirely. Its site rediscovered in the middle of the twentieth century by archaeologists of the Mongolian People's Republic and the Soviet Union. And now much restored by decree of Genghis II Mao IV Khan, self-anointed successor to one ancient empire and one modern one, who wishes to remind the world of the greatness of Genghis I and to make it forget the centuries of Mongol slumber that followed the decline of the Khans.

Karakorum by night glitters with an unearthly brightness, a stunning lunar glow. Mordecai and Crowfoot, leaving the tube-train station, behold the excavated ruins of old Karakorum to their left—a solitary stone tortoise in a field of yellowed grass, the outlines of some brick walls, a shattered pillar. Nearby are gray stone stupas, monuments to holy lamas, erected in the sixteenth century; in the distance, against the parched hills, are the white stucco buildings of Karakorum State Farm, a grandiose project of the defunct Mongolian People's Republic, a vast agricultural enterprise occupying half-a-million hectares of grassland. Between the farm buildings and the stupas lies the Karakorum of Genghis Mao, a flamboyant reconstruction of the original city, the great many-columned walled palace of Ogodai Khan imagined anew, the splendid observatory with its heaven-stabbing turrets, the mosques and churches, the gaudy silken tents of the nobility, the somber brick houses of the foreign merchants, all testifying to the might and magnificence of the latter-day Prince of Princes, Genghis Mao, who, according to a half-suppressed legend, had once had a humbler Mongol name, Choijamtse or Ochirbal or Gombojab—the tales vary according to the teller—and had been a minor functionary, a very insignificant *apparatchik*, in the bureaucracy of the old People's Republic in the vanished Marxist-Leninist days, before the world fell

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apart and a new Mongol empire was constructed on its relict.

The resurrected Karakorum is not merely a sterile monument to antiquity, though: by Genghis Mao's decree it is an amusement park, a place of revelry and pleasures, a twenty-first-century Xanadu blazing with frantic energy. In these black and yellow and scarlet tents one may dine, drink, gamble; the latest hallucinations are for sale here; one may find willing sexual partners of all kinds; those who indulge in the popular cults of the moment—dream-death, transtemporalism, and carpentry are the fashionable ones just now—have facilities for their rituals in Karakorum. Shadrach is a carpentry-cultist himself; Nikki Crowfoot goes in for transtemporalism, and he has dabbled in that too, though not lately. Once he came to Karakorum with Katya Lindman, and that fierce, intense woman urged him to try dream-death with her, but he refused, and she scorned him for his timidity for days afterward. Not with words. Little castrating scowls; sudden harsh flickers of her furious eyes. Mocking quiverings of her elegant nostrils.

As they pass the dream-death pavilion now, neither of them giving it more than a casual glance, Mordecai forcing the image of Katya Lindman's bare blazing body out of his mind, Crowfoot says. "Isn't it risky, your going this far from Ulan Bator only a few hours after he's had major surgery?"

"Not especially. In fact, I always go out the evening after a transplant. A little bonus I give myself after a hard day's work. If anything, it's a better time for a Karakorum trip than most."

"Why so?"

"He's in an intensive-care support-system tonight. If any complications set in, alarms will go off all over the place and one of the low-echelon medics will respond instantly. You know, my job doesn't require me to hold the boss' hand twenty-five hours a day. It isn't needed and he doesn't want it."

Fireworks abruptly explode overhead. Wheels of gold and crimson, spears coursing across the night. Shadrach imagines he sees the face of Genghis Mao filling the sky, but no, but no, just self-deception, the pattern is plainly abstract. Plainly.

"If an emergency comes up, they'll summon you, won't they?" Nikki asks.

"They won't need to," Mordecai tells her. Out of the dream-death pavilion comes a weird discordant music, bagpipes gone awry. He thinks of Katya Lindman crooning in Swedish an hour before the dawn one snowy night, and shivers. He pats his thigh where the implants are and says, "I'm getting the full broadcast, remember?"

"Even out here?"

He nods. "The telemetering range is about a thousand kilome-

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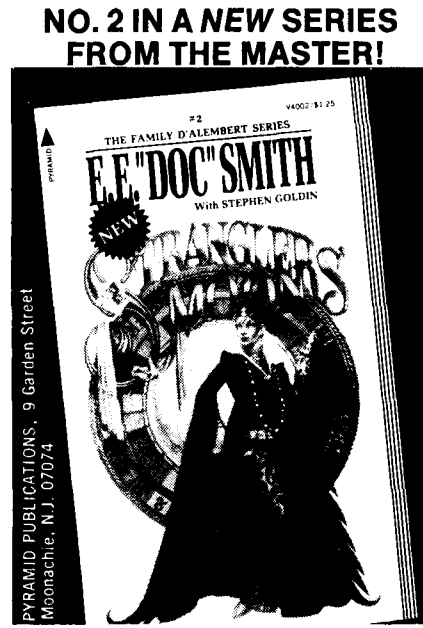
ters. I'm picking him up clearly right this minute. He's resting very comfortably, dozing, I'd say, temperature about a degree above normal, pulse very slightly high, new liver integrating itself nicely and already making positive changes in his general metabolic state. If anything starts deteriorating, I'll know about it immediately, and if necessary I can always get back to him in ninety minutes or so. Meanwhile I'm covered and I'm free to amuse myself."

"Always aware of the state of his health."

"Yes. Always. Even while I sleep, the information ticks into me."

"Your implants fascinate me philosophically," she says. They pause at a sweets-vendor's booth to buy some refreshments. The vendor, a squat thick-nosed Mongol, offers them airag, the ancient Mongol beverage of fermented mare's milk, and, shrugging, Mordecai takes a flask for her and one for himself. She makes a face, but drinks, and says, "What I mean is, looking at you and the Chairman in strict cybernetic terms, it's hard to see where the boundaries of your individuality end and his begin. You and he amount to a single self-corrective information-processing unit, practically a single-life system."

"That's not exactly how I see it," Mordecai tells her. "There may be a constant flow of metabolic information from his body to mine, and



the information I receive from him has some impact on the course of my actions and I suppose ultimately on his, but he remains an autonomous being, the Chairman of the PRC, no less, with all the tremendous power that that entails, and I am only—"

"No. Look at it with a total-systems approach," Crowfoot urges impatiently. "Let's say you're Michelangelo, trying to turn a huge block of marble into the *David*. The figure is within the marble: you must liberate it with your mallet and chisel, right? You strike the block; a chip of marble is knocked off. You strike it again. Another chip. A few more chips and perhaps the outline of an arm begins

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to emerge. The angle of the chisel is slightly different for each stroke, isn't it? And maybe the intensity of the force you use to hit the chisel with the mallet is different, too. You constantly modify and correct your strokes according to the information you're receiving from the cut face of the marble block—the emerging shape, the right cleavage planes, and so on. Do you see the total system? The process of creating Michelangelo's *David* isn't simply one in which you, Michelangelo, act on a passive lump of stone. The marble's an active force too, part of the circuit, in a sense part of the mind-system that is Michelangelo-as-sculptor. Because—"

"I don't—"

"Let me finish. Let me trace the whole circuit for you. A change in the outline of the marble is perceived by your eye and is evaluated by your brain, which transmits instructions to the muscles of your arm having to do with the force and angle of the next blow, and this causes a change in your neuromuscular response as you strike the next blow, producing further change in the marble that causes further perception of change in the eye and a further alteration of program within the brain, leading to another correction of neuromuscular response for the next stroke, and so on, on and on around the loop until the statue is done. The process of carving the statue is a process of perceiving and responding to change, to stroke-by-stroke difference; and the marble is an essential part of the total system."

"It didn't ask to be," Shadrach says mildly. "It doesn't *know* it's part of a system."

"Irrelevant. View the system as a closed universe. The marble is changing and its changes produce changes within Michelangelo that lead to further changes in the marble. Within the closed universe of sculptor-and-tools-and-marble, it's incorrect to view Michelangelo as the 'self,' the actor, and the marble as a 'thing,' the acted-upon. Sculptor and tools and marble together make up a single network of causal pathways, a single thinking-and-acting-and-changing entity, a single *person*, if you will. Now, you and Genghis Mao—"

"Are different persons," Mordecai insists. "The feedback's not the same. If his kidney conks out, I react to the extent that I perceive the malfunction and treat it and arrange for a kidney replacement, but I won't get sick myself. And if something goes wrong with *my* kidneys, it won't affect him in any way."

Crowfoot shrugs. "True but trivial. Don't you see that the causal interlock between the two of you is much more intimate? Your whole daily routine is controlled by the transmissions you get from Genghis Mao: you sleep alone or sleep with me depending on his health, you go to Karakorum or stay by his

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bedside, you experience somatic anxieties if the signal from him starts going critical, you have a whole constellation of life-choices and life-responses that are governed almost entirely by his metabolism. You're an extension of Genghis Mao. And what about him? He lives or dies at your option. He may be Chairman of the PRC, but he would be just another dead man next week if you fail to pick up some key symptom or fail to take the proper corrective action. You're essential to his survival, and he controls many of your movements and actions. One system, Shadrach, one constantly resonating circuit, you and Genghis Mao, Genghis Mao and you!"

Still Shadrach Mordecai shakes his head. "The analogy's close, but not close enough to convince me. Not quite close enough. I'm equipped with some extraordinary diagnostic devices, sure, but they're not all that special; my implants help me respond faster to emergencies than an ordinary doctor might respond to an ordinary patient, but that's all. It's only a quantitative difference. You can define any doctor-patient unit as a single self-corrective information-processing system, of sorts, but I don't think the hookup between Genghis Mao and myself creates any kind of significant difference in that type of system. If I got sick when he got sick, the point would be valid, but—"

Nikki Crowfoot sighs. "Let it pass, Shadrach. It isn't worth all this palaver. In the Avatar lab we constantly have to deal with the principle that the popular notion of 'self' is pretty meaningless, that it's necessary to think in terms of larger information-handling systems, but maybe I'm extending the principle into areas where it doesn't need to go. Or maybe you and I simply aren't communicating very well right now." She closes her eyes for a moment and clenches her jaws as if trying to discharge some jangling current pulsing through her brain. Another barrage of fireworks lights up the sky with garish purple and green streaks. Savage thorny music, all snarls and shrieks, pierces the air. After a moment Crowfoot relaxes, grins, points to the shimmering tent of the transtemporalists a few meters in front of them. "Enough talk," she says. "Now some excitement."

"I shall explain the method of our rite, if you wish," says the transtemporalist. Deep slurred Mongol voice, monolithic face, all nose and cheekbones, the eyes hidden in shadows.

"Not necessary," Mordecai tells him. "I've been here before."

"Ah. Of course." An obsequious bow. "I was not sure of that, Dr. Mordecai."

Shadrach is accustomed to being recognized. Mongolia is full of for-

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eigners but very few of them are black. The sound of his own name, therefore, gives him only the most fleeting jab of surprise. Still, he would have welcomed more anonymity here. The transtemporalist kneels and beckons to him to do the same. They are in a private little cubicle, formed by thick carpets draped over ropes, within the vast dim tent. A thick yellow candle set in a pewter cup on the earthen floor flickers between them, sending a heavy spiral of dark sour smoke toward the tent's sloping top. In Mordecai's nostrils are all sorts of primeval Mongol odors, the reek of shaggy goatskin walls, the stench of what might well be a cow-dung fire somewhere nearby. The floor is densely strewn with soft wood-shavings, a luxury in this land of few trees. The transtemporalist is busy at the chemistry of his vocation, mixing fluids in a tall pewter beaker, an oily blue one and a thin scarlet one, stirring them around with an ivory swizzle stick that makes lively swirl patterns, adding now a sprinkle of a green powder and a yellow one. Hocus-pocus, all of it: Mordecai suspects that only one of these substances is the true drug, the others being mere decoration. But rites demand mystery and color, and these dour priests, claiming all of time and space for their province, must heighten their effects as best they can. Shadrach wonders how far from him Nikki is now. They were parted at the entrance to the transtemporalists' maze of a tent, each led separately into the shadows by silent acolytes. The time-voyage is a journey that one must take alone.

The Mongol concludes his pharmaceutics and, holding the cup tenderly in both hands, passes it above the candle's sputtering flame to Shadrach Mordecai.

"Drink," he says, and, feeling a bit like Tristan, Shadrach drinks. Surrenders the cup. Sits back on his haunches, waiting.

"Give me your hands," the transtemporalist murmurs.

Shadrach extends them, palms upward. The Mongol covers them with his own short-fingered wide-spanned hands and intones some gibberish prayer, unintelligible except for scattered Mongol words that have no contextual coherence. A faint dizziness is beginning in Shadrach Mordecai now. This will be his third transtemporal experience, the first in nearly a year. Once he visited the court of King Baldwin of Jerusalem in the guise of a black prince of Ethiopia, a Christian Moor at the swaggering feasts of the Crusaders; and once he found himself atop a stone pyramid in Mexico, robed all in white, slashing with an obsidian dagger at the breast of a writhing Spaniard spreadeagled on the sacrificial altar of Huitzilopochtli. And now? He will have no choice in his destination. The transtemporalist will choose it for him according to

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some unfathomable whim, aiming him with a word or two, a skillful suggestion as he is cut loose from his moorings by the drug and sent adrift into the living past. His own imagination and historical knowledge, coupled with, perhaps—who knows?—whispered cues from the transtemporalist as his drugged body lies on the floor of the tent—will do the rest. Mordecai sways now. Everything whirls. The transtemporalist leans close and speaks, and it is a struggle to comprehend the words, but Shadrach must comprehend, he needs to hear—

"It is the night of Cotopaxi," the Mongol whispers. "Red sun, yellow sky."

The tent disappears and Shadrach is alone.

Where is he? A city. Not Karakorum. This place is unfamiliar, subtropical, narrow streets, steep hills, iron-grilled doorways, twining red-flowered vines, cool clear air, grand fountains in spacious plazas, white-fronted houses with wrought-iron balconies. A Latin city, intense, hectic, busy.

—*¡Barato aquí! ¡Barato!*

—*Yo tengo un hambre canina.*

Honking horns, barking dogs, the shouts of children, the cries of vendors. Women roasting bits of meat over charcoal braziers in the cobbled streets. A thousand strident people-sounds. Where is there a city with such vigorous life? Why does no one show signs of the organ-rot? They are all so healthy here, even the beggars, even the paupers. There are no such cities. No more, no more. Ah. Naturally. He is dreaming a city that no longer exists. This is a city of yesterday.

—*Le telefonearé un día de estos.*

—*Hasta la semana que viene.*

He has never spoken Spanish. And yet he recognizes the words, and yet he understands them.

—*¿Donde está el teléfono?*

—*¡Vaya de prisa! ¡Tenga cuidado!*

—*¡Maricón!*

—*No es verdad.*

Standing in the middle of a busy street at the top of a broad hill, he is stunned by the view. Mountains! They rim the city, great snow-capped cones, gleaming in the midday sun. He has lived too long on the Mongolian plateau; mountains such as these have become unfamiliar and alien to him. Shadrach stares in awe at the immense glaciered peaks, so huge they seem top-heavy, they seem about to tumble from the sky to crush the bustling city. And is that a plume of smoke rising from the crest of that most enormous one? He is not sure. At such a distance, at least fifty kilometers, is it possible to see smoke? Yes. Yes. Beyond any doubt, smoke. He remembers the last words he heard before the dizziness took him. "It is the night of Cotopaxi. Red sun, yellow sky." The great volcano—is that it? A flawless cone, swathed in snow and

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pumice, its base hidden in clouds, its summit outlined in numbing majesty against the darkening sky. He has never seen such a mountain.

He halts a boy who darts past him.

–*Por favor.*

The boy is wide-eyed, terrified, but yet he stops, looks up.

–*¿Si, señor?*

–*¿Como se llama esta montaña?*

Shadrach points toward the colossal snow-capped volcano.

The boy smiles and relaxes. His fear is gone; obviously he is pleased by the notion of knowing something that this tall dark-skinned stranger does not. He says:

–*Cotopaxi.*

Cotopaxi. Of course. The transtemporalist has given him a front-row ticket to the great catastrophe. This is the city of Quito, then, in Ecuador, and that, trailing smoke to the southeast, is Cotopaxi, the world's loftiest active volcano, and this day must be the 19th of August, 1991, a day that everyone remembers, and Shadrach Mordecai knows that before the sun touches the Pacific tonight the world will be shaken as it rarely has been shaken in all the time of mankind, and an era will end and a reign of fire will be loosed upon civilization. And he is the only person on earth who knows this, and here he stands below great Cotopaxi and he can do nothing. Nothing. Nothing but watch, and tremble, and perhaps perish with the half million who will perish here tonight. Can one die, he wonders, while one is traveling this way? Is it not only a dream, a dream, a dream, and can dreams kill? Even if he dreams an eruption, even if he dreams tons of lava and brimstone descending on his broken body?

The boy is still standing there, staring at him.

–*Gracias, amigo.*

–*De nada, señor.*

The boy waits, perhaps for a coin, but Shadrach has none to give him, and after a moment he runs off, pausing after ten paces to look back and stick out his tongue, then running again, sprinting into an alleyway, disappearing.

And a moment later there is a terrible noise from Cotopaxi and a white column at least a hundred-meters thick rises straight up like a scepter from a secondary cone on the volcano's sloping flank.

Immediately all movement halts in the city. Everyone freezes; every head turns toward Cotopaxi. The white column, pouring from the vent with incredible velocity, rising already to a height of at least a thousand meters above Cotopaxi's summit, is spreading now, filling the sky like a broad plume of feathers, a cloak of live steam. Mordecai perceives a low droning rumbling sound, as of a train passing through the city, but a train for giants, a titanic train that makes lanterns sway and potted plants

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topple from balconies. The cloud of steam has turned gray on top, with tinges of red and yellow toward its outer edges.

–¡Aie! ¡El fin del mundo!

–¡Madre de Dios! ¡La montaña!

–¡Ayuda! ¡Ayuda!

And the flight from Quito begins. Nothing has happened yet, nothing but a roar and a hiss and a column of steam rushing skyward, but nevertheless the people of the city abandon their houses, carrying little or nothing, grasping perhaps a crucifix or a child or a cat or a handful of clothes, crowding into the street, shuffling somberly downhill, northward, long lines of people moving with hunched shoulders, no one looking back, everyone heading out of the city, heading away from Cotopaxi, from the frightening crimson cloud that now looms over the mountain, from the death that soon will come to Quito. These are people wise in the way of volcanoes, and they do not care to stay for the show. Shadrach Mordecai is swept along in the human tide. He towers over these folk as the volcano does over the city, and they glance strangely at him, and some tug at his arms in a kind of appeal, as if they think he is a black deity come to lead them to safety. But he is leading no one. He is following, he is fleeing helplessly with all the rest. Unlike them he does look over his shoulder every few minutes. Whenever he can, whenever the press of refugees is not too powerful, he pauses and turns to see what is happening. The volcano now is spurting little bursts of pumice and light ash, windborne powdery stuff that changes the color of the air, staining it yellow, deepening the sun's hues to an orange-red. The earth seems to be groaning. The whole city shakes. Automobiles laden with well-dressed citizens move slowly through the streets, unable to make headway in the throngs of shuffling pedestrians; there are collisions, shouts, quarrels. Soon the cars have halted altogether and their passengers, quirky-lipped and disdainful, shoulder their way into the lines of humbler folk. Shadrach has been marching for an hour or two now, perhaps three, mechanically pushing himself along; the air has grown thin and chilly, with an acrid reek of brimstone in it, and though it is only the middle of the afternoon the falling ash has so obscured the light that the streetlamps have come on—the ash is accumulating like fine snow in the streets, already ankle-deep—and still Cotopaxi roars and hisses, and still the people straggle northward. Mordecai knows what will happen soon. With the eerie double-edged vision of the time-traveler he looks forward as well as back, remembering the future. Before long there will be the explosion that will be heard thousands of miles away, the earthquake, the clouds of poison gas, the lunatic outpouring of tons of

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volcanic ash that will blot out the sun all over the world, and on this night of Cotopaxi the ancient gods will be let loose on earth and empires will crumble. He has lived through this night once already, but not with the knowledge he now has. Somewhere faraway at this moment is fifteen-year-old Shadrach, all arms and legs and huge eyes, doing his lessons and dreaming of medical school, and he will hear the explosion too, dull and muffled though it will sound after spanning the planet from Quito to Philadelphia, and he will think it is a terrorist's bomb, perhaps, going off downtown, but in the morning he will see the sky tinted yellow and the swollen sun gone all red, and then the fine dust will fall for days, bringing early twilights on these summer evenings, and news will trickle out of South America of the terrible eruption, the loss of hundreds of thousands of lives. What that young Shadrach does not know, what no one knows except the stranger striding through the northern outskirts of Quito under a dirty crimson cloud, is that the eruption of Cotopaxi is more than a natural event: it signals a political apocalypse, the fall of the nations about to begin, the time of Genghis Mao about to arrive.

—*¡El fin del mundo!*

Yes. Yes. The end of the world.

And now the explosion comes.

It happens in stages, first five quick sharp reports like cannon fire; then a long moment of total silence when even the persistent rumble that has gone on for hours abruptly halts; then a violent shaking of the earth and a single monstrous booming sound, the loudest sound Mordecai has ever heard, a sound that breaks windows and splits walls; then silence again; then the rumbling once more; then more cannon fire, bang bang bang, quick hard pops; then a second great boom, five times as powerful as the first, that drops people to their knees clutching at their ears; then silence, an ominous, sinister, nerve-tightening silence; and then the sound of sounds, the sound of a planet splitting apart at its core, an unending grotesque avalanche of sound that makes the neck snap and the arms jerk wildly and the eyes jiggle in their sockets, a sound that rolls over Quito like the trampling foot of an angry god. And the sky turns black and a torrent of red fire spills out of Cotopaxi and burns with a hideous glare on the horizon. The mountain appears to be ripping open. Shadrach can see huge chunks of its crest, slabs of rock that must be the size of great buildings, flying loose and soaring slowly and grandly toward Quito. The perfect cone, once as graceful as Mount Fuji's, is a ruin now, a shattered wreck, dimly visible through the dense clouds of ash and the flying balls of pumice; it is only a stump, irregular and ghastly. The air itself is

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turning. People still struggle onward, moving ever more slowly, dragging themselves along on leaden legs toward a salvation that is not to be reached, but they vomit, they clutch at their throats, they gasp, they choke, they fall.

—Ayuda. Ayuda.

But there is no help to be had. They are dying here in the early afternoon of this sparkling day, sparkling no longer.

Shadrach, trying to breathe an atmosphere that is half ash and half carbon monoxide, falls himself, gets up, falls again, forces himself to rise. He remembers that he is a doctor and kneels beside a fallen woman, a girl, really, whose face is distorted and nearly as black as his own from asphyxiation.

—Yo soy un médico.

—Gracias, señor. Gracias.

Her eyes flutter. She looks to him for aid, medicine, a drink of water, anything. How can he help her? He is a doctor, yes, but can he teach the dying to breathe poisoned air? She gags, shivers, and then—strangely—yawns. She is falling asleep in his arms. But it is a deadly drowsiness, and she will not wake. He releases her. He moves onward, handkerchief over his mouth and nose. Useless. Useless. He falls again and does not rise, he lies in a heap of weeping murmuring victims, a victim himself.

So this is how it was on the night of Cotopaxi. Night and ash, flight and death. That saucy boy, those women roasting bits of meat, the shopkeepers and the bankers, the cab-drivers and the policemen, that tall black-skinned stranger, all dying together now, the hours of frenzied flight a waste, and Cotopaxi's ashy ejecta filling the heavens, giving all the world a blood-red twilight. *El fin del mundo*, yes. Shadrach claws at the ashes filling his mouth. There is another explosion, a lesser one now—for what could equal that last unimaginable apocalyptic blast?—and another, another, and he knows that the booms will continue in diminishing intensity for many hours, even for days. No one will sleep tonight in Ecuador, in Colombia, Venezuela,

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in all of Central America, even in Mexico; the dread thunder of Cotopaxi will resound in Canada, in Patagonia, it will reach far across both oceans, and by dawn, the dust-choked dawn, the black dawn through which no light can penetrate, the first revolution will be under way, the *putsch* in Brazil, the insurrectionists taking advantage of the strange darkness and the universal terror to launch their long-awaited coup, and then the chain reaction, the uprisings triggered by the Brazilian one in Argentina, Nicaragua, Algeria, Indonesia, one bloodbath providing the cue for the next, and all spurred by Cotopaxi, by the great symbol-freighted upheaval of the volcano, the economic crises of the 1970's and the repressions and shortages of the impoverished 1980's leading inexorably to the worldwide chaos of 1991, the global revolution, the long *Walpurgisnacht* touched off in some incalculable way by the volcano's eruption.

So this is how it was on the night of Cotopaxi. The angry gods shaking the world and bringing the nations into destruction. Shadrach bows his head, closes his eyes, surrenders to the soft warm fragrant ash that drifts peacefully upon him. This is the night of Cotopaxi, yes, *el fin del mundo*, the sounding of the last trump, the opening of the seventh seal, and he has been part of it, he has tasted the pumice of the volcano. And now he sleeps.

He stands in the gravel-strewn walk outside the tent of the transtemporalists, dazed, the sulphurous taste of Cotopaxi somehow still in his mouth. Nikki has not yet emerged. Other people he knows wander by, members of Genghis Mao's staff, flowing past him down the midway toward the garish cluster of gaming-pavilions at the western end of the pleasure-complex: there goes Frank Ficifolia, the jowly little communications man who designed Surveillance Vector One, and after him a Mongol military aide-de-camp, Gonchigdorge, all ribbons and medals in his comic-book uniform, and then two of the Committee vice-chairmen, a pallid Turk named Eyuboglu and a burly Greek named Ionigylakis. Each, as he passes, greets Shadrach in characteristic style, Ficifolia warm and effusive, Gonchigdorge off-handed and remote, Eyuboglu wary, Ionigylakis boisterous. Shadrach Mordecai manages a nod and a glassy smile in return, no more. *Yo soy un médico.* He still feels the earth rumbling. He wishes everyone would let him alone. In Karakorum one deserves a little privacy. Especially right now. The significant sectors of his consciousness are still in the suburbs of Quito, sinking under tons of fine hot ash. Coming out of transtemporalism is always something of

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a shock, but this is too much, it is as bad as eviction from the womb; he is vulnerable and fuddled, unable to cope with the social rituals. Those rough globules of airy pumice, that scent of brimstone, that inescapable sleepiness, above all that crushing sense of transition, that feeling of one world falling apart and a new, strange one being formed–

Out of the transtemporalists' tent now comes a short pigeon-breasted man with crooked teeth and astonishing bushy red eyebrows. He is Roger Buckmaster, British, a microengineering expert, competent and usually sullen, a man whom few people seem to know well. He plants himself near the exit of the tent, a few meters from Shadrach Mordecai, and digs both feet firmly, flatfootedly, into the gravel as though he is uncertain about his balance. He has the stunned look of a man who has just been thrown out of a pub after five beers too many.

Mordecai, though he has only a distant acquaintance with Buckmaster and just now has especially little interest in a conversation with him, knows all too well how confusing the first moments outside the tent can be, and is sympathetic. He feels impelled to meet Buckmaster's wobbly gaze with some sort of polite gesture; he smiles and says hello, thinking that he will now retreat into his own confusion and fatigued meditations.

Buckmaster, though, blinks and glares aggressively. "It's the black bahstard!" he says. His voice is thick, phlegmy, high-pitched, not at all friendly. "The black bahstard himself!"

"Black bahstard?" Mordecai repeats wonderingly, mimicking the accent. "Black bahstard? Man, did you call me–"

"Bahstard. Black."

"That's what I thought you said."

"Black bahstard. Evil as the ace of spades."

This is ludicrous. "Roger, are you all right?"

"Evil. Black and evil."

"I heard you, yes," Shadrach says. A miserable throbbing begins along the left side of his skull. He regrets having acknowledged Buckmaster's presence; he wishes Buckmaster would disappear. The racial slur itself is more grotesque than insulting to him, for he has never had any reason to feel defensive about his color, but he is puzzled by the gratuitousness of the attack and he remains too deeply under the spell of his own powerful transtemporal experience to want any sort of interaction with a truculent clown like Buckmaster, not now, above all not now. Perhaps the thing to do is ignore him. Shadrach folds his arms and steps back against a light-pillar.

But Buckmaster says into Shadrach's silence, "You don't feel covered with shame, Mordecai?"

"Look, Roger–"

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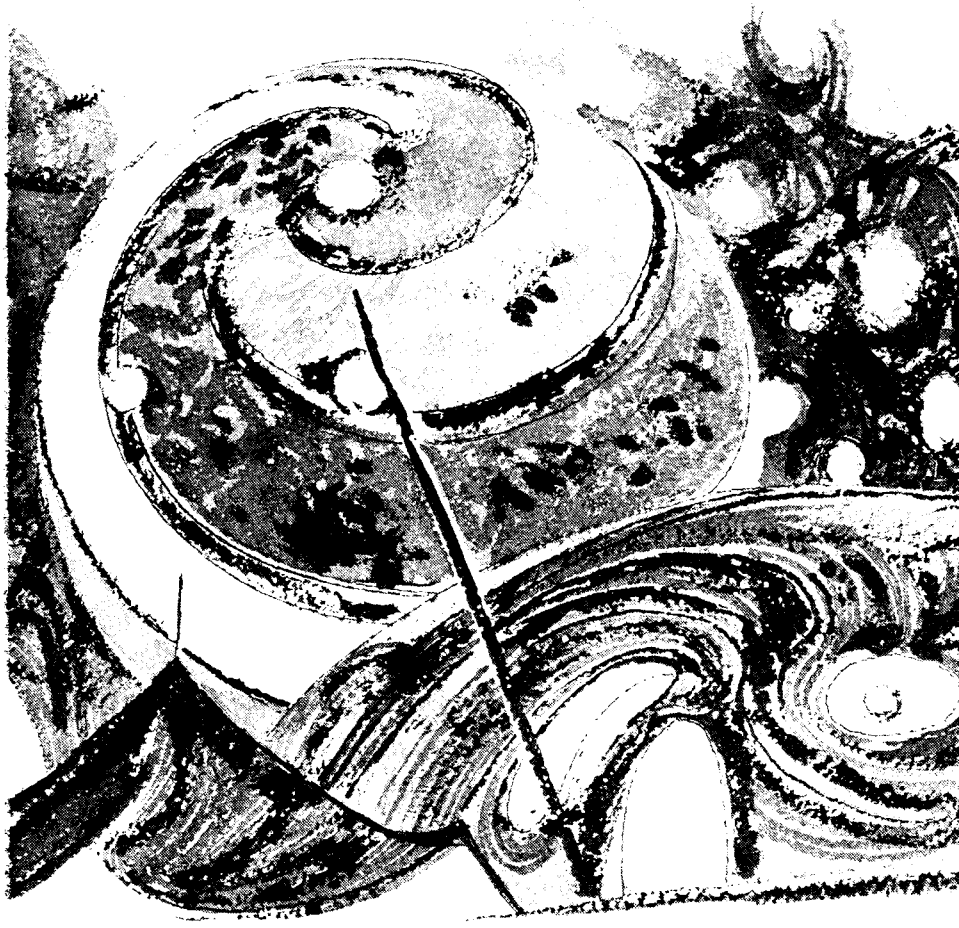

"Drenched with guilt for every filthy act of your treacherous life?"

"Come *on*. What have you been drinking in there, man?"

"The same as everyone else. Just the drug, the drug, the time-drug, whatever they give you. D'ye think they fed me hashish? D'ye think I'm high on whiskey? Oh, no, just the time-drink, and it opened my eyes, let me tell you, it opened them wide!" Buckmaster advances until he stands no more than thirty centimeters from Shadrach Mordecai, glaring up at him, shouting. The pain in Shadrach's skull is that of a spike being hammered deep. "I've seen Judas sell Him *out*!" Buckmaster roars. "I was there, in Jerusalem, at the Supper, watching them eat. Thirteen at the table, eh? I poured the wine with my own hands, you black devil. I watched Judas smirking, saw him whispering in His ear, even, and then

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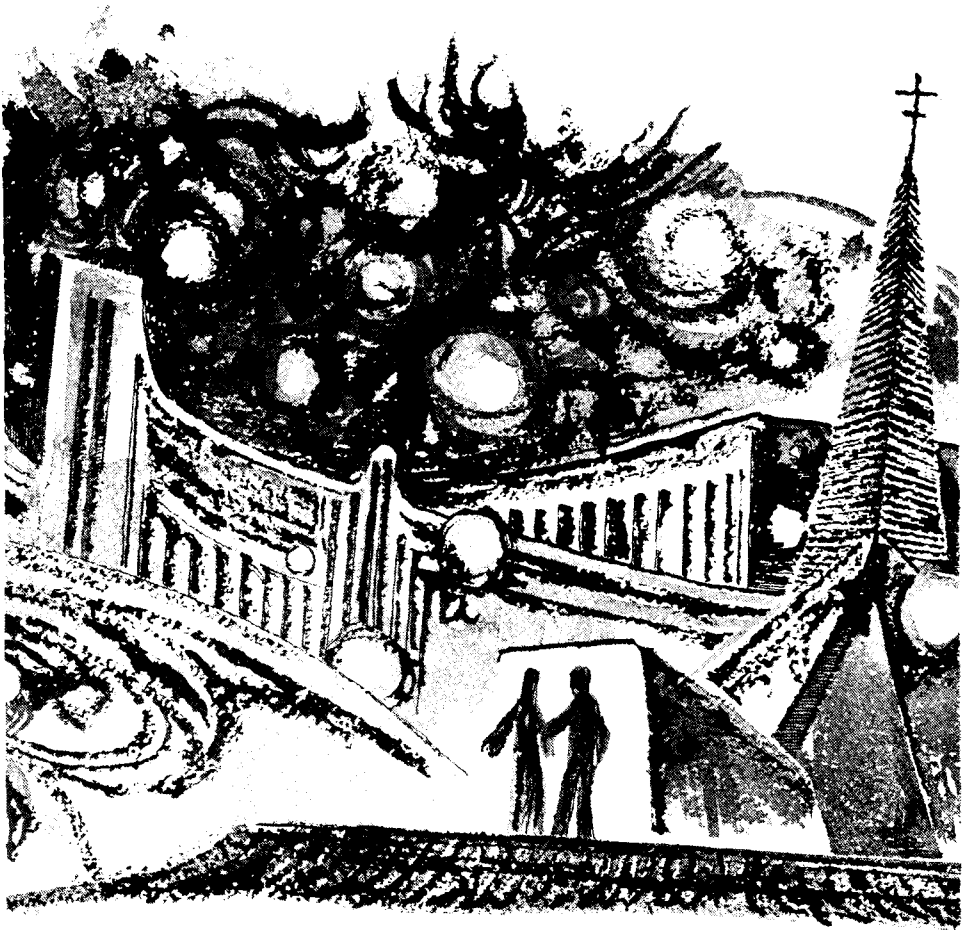

out into the garden, y'know. Gethsemane, there in the darkness—"

"Do you want a trank, Roger?"

"Keep off me with your filthy pills!"

"You're getting overwrought. You ought to try to calm yourself."

"Listen to him doctoring me. *Me.* No, you won't dope me, and you'll pay heed while I tell you—"

"Some other time," Shadrach says. He is pinned between Buckmaster and the light-pillar, but he slips aside and makes broad swimming gestures in the air between them, as though Buckmaster is a noxious vapor he'd like to blow away. "I'm tired now. I've had a heavy trip in there myself. I can't handle any of this at the moment, Buckmaster, if you don't mind. All right?"

"You bloody well will handle it. I want to tell you. I've got you here and I'll tell you. I saw it, everything, Judas coming up to Him and kissing Him in the garden, and

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saying, Master, master, just as it is in the Book, and then the Roman soldiers closing in and arresting him—oh, the bloody betraying bahstard. I saw it, I was there. I understand now what guilt means. Do you? You don't. And you're as guilty as he was, in a different way but the same kind, Mordecai."

"I'm a Judas?" Shadrach shakes his head wearily. Drunks irritate him, even if they are drunk only on the transtemporalists' drug. "I don't understand any of this. Who is it I'm supposed to have betrayed?"

"Everyone. All of mankind."

"And you say you aren't drunk."

"Never been more sober. Oh, my eyes are open now! Who is it who keeps him alive, answer me that? Who's there by his side, giving him injections, medicines, pills, yelling for the bloody surgeon every time he needs a new kidney or a new heart, eh? Eh?"

"You want the Chairman to die?"

"You're damn right I do!"

Shadrach gasps. Buckmaster has obviously been driven insane by his transtemporal experience; Shadrach can no longer be annoyed with him. The angry little man must be protected against himself. "You'll be arrested if you go on this way," Shadrach says. "He might be listening to us right now."

"He's flat on his back half-dead from the operation," Buckmaster retorts. "Don't you think I know that? You put a new liver into him today."

"Even so, there are spy-eyes everywhere, recording instruments—you designed some of them yourself, Buckmaster."

"I don't care. *Let* him hear me."

"So now you're a revolutionary?"

"My eyes are open. I've had a revelation in that tent. Guilt, responsibility, evil—"

"You think the world would be better off with Genghis Mao dead?"

Fiercely Buckmaster cries, "Yes! Yes! He's draining us all so he can live forever. He's turned the world into a madhouse, into a bloody zoo! Look, Mordecai, we could be rebuilding, we could be passing around the Antidote and healing the whole world, not just the favored few. We could go back to what we had before the War, but no, no, we're ruled by a bloody Mongol Khan, can you imagine that? A hundred-year-old Mongol Khan who wants to live forever! And he'd have been dead five years ago but for you."

Shadrach sees where Buckmaster is heading, and he presses his hands to his temples in dismay. He wants more desperately than ever to escape from this conversation. Buckmaster is a fool, and his onslaught is cheap and obvious. Shadrach has thought all this through, long ago, considered the moral problems, and dismissed them. Of *course* serving an evil dictator is

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wrong. No job for a nice sincere dedicated black boy from Philadelphia who wants to do good. But is Genghis Mao evil? Are there any alternatives to his rule, other than chaos? If Genghis Mao is inevitable, like some natural force, like the rising of the sun or the falling of the rain, then no guilt attaches to serving him: one does what seems appropriate, one lives one's life, one accepts one's karma, and if one is a doctor then one heals, without considering the ramifications of one's patient's identity. To Shadrach this is no glib rationalization, but rather a statement of acceptance of destiny. He refuses to assume burdens of guilt that have no meaning to him, and he will not let Buckmaster, of all people, flagellate him over absurdities nor accuse him of misplacing his loyalties.

He notices that Nikki Crowfoot has come out of the transtemporalists' tent and is standing to one side, hands on her hips, waiting for him, and he says to Buckmaster, "Excuse me. I have to go now."

Nikki seems transfigured. Her eyes are aglow, her face glistens with ecstatic sweat, her whole body seems to gleam. As Shadrach strides toward her, she acknowledges him with a mere tilt of her head, but she is far away, still lost in her hallucination.

"Let's go," he says. "Buckmaster's a little crazy tonight and he's making a nuisance of himself."

He reaches for her hand.

"Wait!" Buckmaster yells, running toward them. "I'm not through with you. I've got more to tell you, you black bahstard!"

Mordecai shrugs and says, "All right. You can have one more minute. What do you want me to do, exactly?"

"Leave off tending him."

"I'm a doctor, Buckmaster. He's my patient."

"Precisely. And that's why I call you a guilty bahstard. Billions of people to care for in the world, and *he's* the one you choose to look after. Dooming us all to decades more of Genghis Mao."

"Someone else would serve him if I didn't," Shadrach says gently.

"But you do. *You.* And I must hold you responsible."

Astonished, baffled by the force and persistence of Buckmaster's attack, Shadrach says, "Responsible for what?"

"For the way the world is. The whole bleeding mess. The continued threat of universal organ-rot twenty years after the Virus War. The hunger, the poverty. Oh, don't you have any shame, Mordecai? You with your legs full of machinery that tell you every twitch of his blood pressure so you can run to him even faster?"

Shadrach glances at Nikki, appealing to her to do something to rescue him. But she still has that far-off look; she does not appear to

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be aware of Buckmaster at all.

Angrily Mordecai says, "Who designed that machinery, Roger?"

Buckmaster recoils. He has been hit where it hurts. His cheeks blaze; his eyes glisten with furious tears. "I! I did! You bahstard, I admit it, I built your dirty implants. Don't you think I know I share the guilt? Don't you think I understand that now? But I'm getting out. I won't bear the responsibility any longer."

"This is suicidal, the way you're carrying on." Shadrach Mordecai points to shadowy figures on the periphery of the path, high staffers who hover in the darkness, unwilling to come within range of possible spy-eyes while they enjoy Buckmaster's juicy lunatic outburst. "There'll be a report of all this on the Chairman's desk tomorrow, Roger, more likely than not. You're destroying yourself."

"I'll destroy *him*. The bloodsucker. He holds us all for ransom, our bodies, our souls, he'll let us rot if we don't serve him, he—"

"Don't be melodramatic. We serve Genghis Mao because we have skills and this is the proper place to employ them," Mordecai says crisply. "It's no fault of ours that the world is as it is. If you'd rather have been out in Liverpool or Manchester living in some stinking cellar with your intestines full of holes, you could have been."

"Don't goad me, Mordecai."

"But it's true. We're lucky to be here. We're doing the only sane thing possible in a crazy world. Guilt is a luxury we can't afford. You want to walk out now, go ahead, go, Roger. But you won't want to leave the Khan when you calm down in the morning."

"I refuse to have you patronize me."

"I'm trying to protect you. I'm trying to get you to shut up and stop shouting dangerous nonsense."

"And I'm trying to get you to pull the plug and free us from Genghis Khan Mao," Buckmaster wails, flushed and wild-eyed.

"So you think we'd be better off without him?" Shadrach asks. "What are your alternatives, Buckmaster? What kind of government would you suggest? Come on. I'm serious. You've been calling me a lot of unpleasant names, now let's have some rational discussion. You've become a revolutionary, right? Okay. What's your program? What do you want?"

Buckmaster is beyond the moment for philosophical discourse, however. He glowers at Mordecai in barely controlled loathing, framing words that will not leave his throat except as incoherent guttural growls; he clenches and unclenches his fists, he sways alarmingly, his reddened cheeks turn scarlet. Shadrach, all sympathy long gone, turns from him and reaches toward Nikki Crowfoot again. As they begin to walk away together Buckmaster rushes forward in a clumsy

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flailing lunge, clamping his hands on Shadrach's shoulders and trying to pull him down. Shadrach pivots gracefully, bends slightly to slip free of Buckmaster's grasp, and, when Buckmaster hurls himself at him, seizes him about the ribs, spins him around, and holds him immobile. Buckmaster squirms, kicks, spits, sputters, but Shadrach is much too strong for him. "Easy," Shadrach murmurs. "Easy. Relax. Let go of it, Roger. Let go of everything." He holds Buckmaster as one might hold an hysterical child, until at length he feels Buckmaster go slack, all the frenzy leaving him. Mordecai releases him and steps back, hands poised at chest level, ready for a new lunge, but Buckmaster is spent. He backs away from Mordecai in the slinking heavy-shouldered walk of a beaten man, pausing after a few paces to scowl and mutter, "All right, Mordecai. Bahstard. *Stay* with Genghis Mao. Wipe his decrepit arse for him. See what happens to you! You'll finish in the furnace, Shadrach, in the furnace, in the bloody furnace!"

Shadrach laughs. The tension is broken. "The furnace. I like that. Very literary, Buckmaster."

"The furnace for you, Shadrach!"

Mordecai, smiling, takes Crowfoot's arm. She still looks radiant, ecstatic, lost in transcendental raptures. "Let's go," he says. "I can't take any more of this."

Softly, in a dream-furry voice, she says, "What did he mean by that, Shadrach? About the furnace?"

"Biblical reference. Shadrach, Meshach, Abednego."

"Who?"

"You don't know it?"

"No. Shadrach, it's such a lovely night. Let's go somewhere and make love."

"Shadrach, Meshach, Abednego. In the Book of Daniel. Three Hebrews who refused to worship Nebuchadnezzar's golden idol, and the king cast them into a burning fiery furnace, and God sent an angel to walk with them in there, and they were unharmed. Strange you don't know the story."

"What happened to them?"

"I told you, love. They were unharmed, not a hair of their heads singed, and Nebuchadnezzar called them forth, and told them that their God was a mighty god, and promoted them to high office in Babylon. Poor Buckmaster. He ought to realize that a Shadrach wouldn't be afraid of furnaces. Did you have a good trip, love?"

"Oh, yes, yes, Shadrach!"

"Where did they send you?"

"Joan of Arc's execution. I watched her burning, and it was beautiful, the way she smiled, the way she looked toward heaven." Nikki presses close against him as they walk. Her voice still comes to him out of some realm of dream; that bonfire has left her stoned.

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"The most inspiring trip I ever had. The most deeply spiritual. Where can we go now, Shadrach? Where can we be alone?"

He is weary of Karakorum after his encounter with Buckmaster, and he sees now how this whole long day has drained his vigor and glazed his soul; if he could he would stagger to the tube-train and let himself be whisked off to Ulan Bator and his hammock and a night of—at last—deep, satisfying sleep. But Crowfoot, eerily exultant, glows now with insistent lusts, and he does not feel strong enough to confront her disappointment if he denies her now. Arm in arm, therefore, they go to the lovers' hospice at the north end of the pleasure-grounds, a bright-skinned orange-and-green geodesic dome, and with a touch of his thumb against the credit-plate he rents a three-hour room.

Not much of a room. Bed, washstand, clothes rack, within a little slope-ceilinged segment of the vast dome, annoying bluish-purple granular-finish walls, but the place suffices. It suffices. Nikki whips off the golden-mesh robe that is her only garment and from her nude body, four meters away across the room, comes such a rush of seductive energy, such a flow of force oscillating cracklingly up and down the whole electro-erotic spectrum, that Shadrach's fatigue is swept away, Cotopaxi and Buckmaster recede into ancient history, and he swoops joyously toward her. Mouth seeking mouth, hands rising to breasts. She embraces him, then darts away, prudently offering her left hip to the contraceptron next to the washstand: presses the switch, receives the benevolent bath of sterilizing soft radiation, and returns to him. The tattooed no-preg symbol on her tawny flank, a nine-pointed star, glows in brilliant chartreuse, telling them that the irradiation has done its job.

They tumble to the bed.

Some things never change. There is a man only 400 kilometers to the east who has had four livers and seven kidneys thus far, and in a tent just a few hundred meters from this bed they sell a drug that lets one be an eye-witness to the betrayal of the Savior, and there is a machine in Ulan Bator that flashes instantaneous pictures of virtually everything that is happening anywhere in the world, and all of these things would have been deemed miracles only two generations ago, but nevertheless in this miracle-infested world of 2012 there have been no significant technological improvements on the act of love. Oh, there are cunning drugs that are said to enhance the sensations, and there are clever devices that suppress fertility, and there are some other little biomechanical gimmicks that the sophisticated sometimes employ, but all

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of these are simply updated versions of peripheral equipment that has been in use since medieval days. The basic operation has not yet been digitalized or miniaturized or randomized or otherwise futurized, but remains what it was in the days of the australopithecines and the pithecanthropoids, that is, something that mere naked people do, pressing their humble natural-born bodies one against the other.

The bodies press, copper clasping ebony, acting out the ancient rite. Shadrach surprising himself with the intensity of his passions. He is not sure whether this energy comes from Nikki, via some mysterious telepathic transfer, or from some unexpected reservoir within himself, but he is grateful for it whatever the source, and rides it to an agreeable conclusion. Afterward he slips easily into a sound sleep, awakening only when the mellow but inescapable beeper-tone signals the approaching end of their three-hour rental period. He finds himself cozily pillowed against Nikki. She is awake and evidently has been for some time, but her smile is beatific and no doubt she would have cradled him like that all night, an appealing idea. The night is well-nigh gone, in any case. They allow themselves a brief cuddle, rise, wash, dress, go forth with hands lightly touching into the chilly moon-dappled darkness. Like children unwilling to leave the playground, they drift into a gaming-parlor, a wine-house, a light-studio, all three packed with raucous debauched-looking fun-seekers, but they stay no more than a few minutes in each place, drifting out as aimlessly as they went in, and finally they admit to one another that they have had enough for one night. To the tube-train station, then. Dawn will be here soon. From the ceiling above the station platform dangles a huge glowing green globe, a public telescreen showing a late-night news program, and blearily Shadrach peers at it: the face of Mangu looks back at him, sincere and earnest and deplorably youthful. Mangu is making a speech, so it seems. Gradually, for he is very tired, Shadrach perceives that it is the classic Roncevic Antidote speech, the one which Genghis Mao traditionally makes every five or six months and which now apparently has been delegated to the heir apparent. ". . . . major laboratory breakthroughs," Mangu is saying. ". . . . encouraging progress . . . . fundamental qualitative transformations of the manufacturing technology . . . . the unceasing efforts of the Permanent Revolutionary Committee . . . . the diligent and persevering leadership of our beloved Chairman Genghis Mao . . . . there can be no doubt any longer . . . . large-scale distribution of the drug throughout the world . . . . the scourge of organ-rot driven from our midst . . . . stockpiles in-

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creasing daily . . . . a time is approaching when . . . . a happy, healthy humanity . . . ."

A florid, goggle-eyed man standing a few meters farther down the platform says in a loud harsh whisper to the woman who accompanies him, "Certainly. In only ninety to one-hundred years."

"Quiet, Béla!" his companion cries, sounding genuinely alarmed.

"But it is the truth. He lies when he says the stockpiles are increasing daily. I have seen the figures. I tell you, I have seen *reliable* figures."

Mordecai finds this interesting. The florid man is Béla Horthy, a dour but volatile Hungarian physicist, creator of the great fusion plant at Bayan Hongor that supplies power for most of northeastern Asia. He also happens to be Minister of Technology for the Permanent Revolutionary Committee, and it is a little odd to hear so formidably well-connected a government leader uttering such scandalous subversion in public. Of course, this is Karakorum, and Horthy, looking boneless and out of focus just now, is obviously adrift on some potent hallucinogen, but still, but still—

"The Antidote stockpiles are stable at best, or even decreasing slightly," Horthy continues, framing his words with the exaggerated precision of the extremely intoxicated. "What Mangu tells us is a lie intended to pacify the populace. He thinks that telling them such things will make them happy and induce them to love him. Pfaugh!" The woman tries desperately to quiet him. She is short and compact, efficiently constructed with her center of gravity close to the ground; her face is partly obscured by an ornate, flamboyant green domino, but Shadrach, after a moment, recognizes her as Donna Labile, no less a mogul than Horthy himself, in fact Minister of Demography for the Committee, whose responsibility it is to maintain a reasonable balance between births and deaths. Masked or not, it is she, no mistaking that ferocious jaw, and Shadrach observes that Horthy too has a mask, dangling from his left hand. Perhaps he thinks he still wears it. She struggles with him, taking the mask from his limp hand and attempting to fasten it in place, but he brushes her aside, and, lurching toward Shadrach Mordecai, greets the doctor with so grandiose a bow that he nearly pitches himself from the platform. Donna Labile, flapping his discarded mask about, flutters around him like an angry insect. "Ah, Dr. Mordecai!" Horthy bellows. "Our leader's devoted Aesculapius! I greet you!"

". . . . the climax of our unending struggle against . . . ." Mangu says from the glowing globular screen.

Horthy jerks a thumb at the image of the heir apparent. "Do you believe that trash, Mordecai?"

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Shadrach has his own suspicions about the sincerity of the Khan's oft-expressed plan for universal distribution of the Roncevic Antidote, but they are suspicions rather less than half-formed, and in any case this is no place to voice them. Softly he says, "I'm not a member of the Committee, Dr. Horthy. The only inside information I have concerns such things as the endocrine balance of Genghis Mao."

"But you have an opinion, haven't you?"

"My opinion's an uninformed one, and therefore worthless."

"Such a diplomat you are!" Horthy says in contempt.

"Pay no attention," Donna Labile begs. "He's had too much tonight. Eating kot and yipka like so much candy, drugging himself crazy, now risking his whole career—"

"It seems to be the night for it," Shadrach remarks.

"A filthy hoax." Horthy says heavily, shaking his fist at the screen. He is trembling, ashen-faced beneath his florid glow, sweating profusely. "Cruel, sinister, bestial—" and he lapses into a series of unintelligible sibilant expletives, presumably Magyar, toward the end of which he begins to sob. Donna Labile, meanwhile, has disappeared. After a moment she returns leading two tall men who wear the gray-and-blue uniform of the Citizens' Peace Brigade. It is odd to find a couple of Citpols here, for Shadrach thinks of Karakorum as an open city, naturally monitored by secret spy-eyes and the usual audio bugs but otherwise unpoliced; and these two are more than ordinarily repellent even for Citpols, for they look like identical ugly twins, gray-faced and gray-eyed, with flat heads and stiff close-cropped hair and strange malproportioned bodies, all legs and no middle. They walk in a weird clucking stride, like a couple of poorly programmed robots, but they appear to be human, more or less: perhaps the Committee, finding volunteers scarce, is raising a clone of monsters to serve as policemen. They surround Horthy and speak to him in low, urgent tones. One of them takes the domino from Donna Labile and with curiously fussy, almost mincing, gestures, affixes it over the bridge of Horthy's nose. Then, slipping their arms gently under those of the Minister of Technology, they lead him, lifting him a bit so that his feet are dragging, toward a gray enameled door at the far end of the platform. Shadrach Mordecai is uncertain whether they are arresting him at Donna Labile's instigation or—more likely—are hauling him up to some behind-the-scenes sobering-up facility before he can compromise himself further.

". . . . a glorious epoch in the splendid history of the human race . . . ." Mangu booms.

The tube-train arrives. The sur-

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vivors of the night's revelries at Karakorum move slowly, sleepily aboard.

Before he heads for his hammock, Shadrach Mordecai visits the Khan. Though the implants tell him all is well, he feels obligated after his outing to make a personal call on his patient. It is early morning, and Genghis Mao lies in blissful sleep: through the electroencephalographic node in Mordecai's haunch travel the slow rhythmic quivers of the Chairman's peaceful delta waves. All the telemetered data reaching Shadrach is encouraging: blood pressure good, lungs clear of fluid, temperature back to normal, cardiac activity fine, bile production excellent. The newly installed liver has obviously established itself already and has begun to undo the deteriorations of the recent weeks. Shadrach passes through the interface and enters the bedroom where the Chairman rests within the intricate cocoon of the intensive-care support-system. The biometer readings on the support-system's instrument panel instantly confirm Shadrach's long-distance diagnosis: the Chairman is doing amazingly well. None of the emergency equipment has been needed, neither the oxygen tent nor the electrodialysis machine nor the heart-lung respirator nor the twelve or fourteen other instruments. There he lies, relaxed, a faint smile on his thin lips, this man of ninety years or so, only sixteen hours out of major surgery and already nearly strong enough to resume the stress of normal life. But of course there is nothing normal about Genghis Mao's body, reconstructed so many times out of so many healthy borrowed parts: like the cannibal chieftain, he has feasted on the flesh of heroes, and their strength has become his strength. And, Shadrach suspects, there is some quality of the mind within that tapering triangular skull that will not admit bodily weakness, that banishes it altogether from his metabolic cycle. The doctor stands a few moments by the bedside, admiring Genghis Mao's toughness of constitution, half-expecting Genghis Mao to wink at him, but the Khan's sleep holds him utterly.

Off to his own, then. With Genghis Mao in such fine shape, Shadrach feels free to sleep until sleep is done with him, even if that is mid-afternoon. Crowfoot already lies curled and dozing in his hammock; he snuggles in beside her, and lets consciousness go from him.

He is awakened some hours later by an internal jolt that nearly throws him from the hammock. A geyser of adrenalin floods his bloodstream; his heart begins to pound, his limbs tremble, all systems switching on in a violent alarm reaction. Automatically he begins a process of self-diagnosis, considering and rejecting within the

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first fraction of a second such possibilities as a cornonary thrombosis, a cerebral hemorrhage, pulmonary edema; a moment later, as the thunderous tachycardia begins to subside and his breathing starts to return to normal, he realizes that it is nothing more serious than an episode of shock leading into a classic fight-or-flight syndrome; and an instant after that he becomes aware that it is all purely vicarious, that there is nothing wrong with him at all but that he is getting an intense overload via the telemetering system that links him to Genghis Mao.

He leaps from the hammock, sending it swinging wildly. "Shadrach?" Nikki asks, her voice groggy and dim. "Shadrach, what's happening?"

Catching the hammock for a moment to stabilize it, he mutters an apology. "Trouble with the Khan," he says, groping along the floor for his casually discarded clothing. He is fully awake now, but his body is so saturated with the hormonal outpourings engendered by surprise and alarm that his hands shake and his jangled mind refuses to focus on the simple tasks of dressing. Has the Chairman's life-support system malfunctioned? Have assassins broken into Genghis Mao's bedroom? The Chairman still lives—the telemetering leaves no doubt of that—and whatever it was that gave Genghis Mao so severe a shock seems already to be over, for his biophysical output is settling back toward normal, though there are ample indications of continuing neurasthenic hyperesthesia and associated cardiovascular and vasomotor distress.

Wearing only his trousers and still feeling wobbly—never before, in all the time he has worn the implants, have the signals from Genghis Mao had such an impact on him—he approaches the interface. "Shadrach Mordecai to serve the Khan," he says, and waits, and nothing happens for nearly a minute. Dr. Mordecai repeats the password, more urgently. Still the door remains shut. "Come on!" he snaps. "The Khan might be dying in there, and I have to get to him, you idiot machine!" Lights flash, scanners scan, but nothing else occurs. Shadrach realizes that the interface system must have gone into emergency mode, under which the flow of personnel to and from the inner chambers is even more strictly controlled than usual. This supports the hypothesis of an assassination attempt. Shadrach shouts, gesticulates, pounds the interface with his fists, even makes faces at it; but the security system is obviously concerned with other matters, and it will not let him in. By the time the door finally does open, he estimates, four or five minutes have elapsed. The data coming from Genghis Mao holds firm, at least: the Khan's signals indicate that he is still disturbed and overexcited

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but that he is slowly recovering from his moment of alarm.

Maddeningly, Shadrach is kept another minute or so in the inner holding chamber; at last it yields, and he lopes swiftly through Surveillance Vector One, which is deserted, to Genghis Mao's bedroom. Here the secondary door-scanner delays him no more than the usual microsecond, and he bursts in to find Genghis Mao alive and awake, sitting up in bed, surrounded by five or six servants and a dozen or more members of the Committee, all milling about in a frenzied excitement very much contraindicated at this phase of the Chairman's recuperation. Mordecai sees General Gonchigdorge, Vice-Chairman Ionigylakis, Security Chief Avogadro, even Béla Horthy, looking horribly liverish and hung over after his excessive night in Karakorum. And more people are constantly arriving. Shadrach is appalled. He can hear the voice of Genghis Mao, clear but weak, cutting through the overall hubbub, but there is such a mob around the bed that Mordecai is unable to reach the Khan's side.

"Terrible, terrible," Ionigylakis says, shaking his head from side to side like a wounded bear.

Shadrach turns to him. "What's going on?"

"Mangu," Ionigylakis blurts. "Assassinated!"

"What? How?"

"Out the window. Off the balcony." Ponderously the big Greek pantomimes the action with great sweeps of his arm—the open window, the draperies fluttering in the breeze, the curve of the body as it executes its swooping seventy-five story descent, the abrupt ghastly termination of the graceful dive, the hideous impact at plaza level, the tiny final rebounding motion of the crumpled body.

Shadrach shudders. "When was this?"

"Ten, fifteen minutes ago. Horthy was just arriving at the tower. He saw the whole thing."

"Who notified the Khan? Horthy?"

Ionigylakis shrugs. "How would I know?"

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"They should have waited. The shock of news like that—"

"First I heard of it, I was at my desk in Committee Vector One and the lights flash emergency mode. Then people running around everywhere, crazy. Then everyone running in here."

"Which is even crazier," Shadrach says, scowling. "Making a lot of noise, upsetting the Khan's nervous system, filling the room with potentially infectious bacteria—doesn't anyone have any sense? We're jeopardizing his life in this chaos. Help me clear the room."

"But the Khan has sent for these people!"

"Doesn't matter. He doesn't need them all. I'm responsible for his health, and I want everybody out of here except, oh, Avogadro and Gonchigdorge and maybe Eyuboglu."

"But—"

"No buts. The rest of you ought to return to Committee Vector One so you can handle more trouble if more trouble comes. What if this is the start of a worldwide revolutionary uprising? Who's going to face the crisis if you're all in here? Go. Go. I want to clear the room. Get everybody out, will you? That's an order."

Ionigylakis still looks doubtful, but after a moment's hesitation he nods and begins pushing people enthusiastically toward the door, bellowing at them that they must leave, while Shadrach, catching the attention of the security chief, tells him to post his men in the hall to keep visitors out.

Shadrach approaches the bed. Genghis Mao looks drawn and tense, his forehead moist, shiny, his skin tone pallid and grayish. He is breathing shallowly and his eyes, always restless, move now with manic intensity. The life-support system has activated itself and is feeding the Khan a steady flow of glucose, sodium chloride, and blood plasma; Shadrach, glancing quickly at the readings on the instrument panel and integrating them with his own telemetered inputs, assesses Genghis Mao's level of blood potassium and plasma magnesium, his capillary permeability, his arteriolar vasoconstriction, and his venous pressure, and makes manual adjustments in the rate of medication. "Try to relax," he tells Genghis Mao. "Sit back. Let your limbs go limp."

"They killed him," the Khan says hoarsely. "Have you heard? They threw him from his window."

"Yes. I know. Lie back, please, sir."

"The killers must still be somewhere inside this building. I'll supervise the investigation myself. Wheel me into Surveillance Vector One, Shadrach."

"That won't be possible. You'll have to remain here, sir."

"Don't talk that way to me. Avogadro! Avogadro! Help me into the wheelchair!"

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"I'm sorry, sir," Shadrach murmurs, signaling frantically behind his back to Avogadro to ignore the command of Genghis Mao. At the same time Shadrach nudges a pedal that sends a flow of tranquilizing 9-pordenone into the Chairman's body. "It could be fatal for you to leave the bed now, sir. Do you understand me? It could kill you."

Genghis Mao understands that. He sinks back against the pillow, looking almost relieved at being overruled, and as the drug takes effect his face relaxes, his demeanor becomes far less intense. Genghis Mao is much weaker, Shadrach realizes, than the instruments indicate. "They killed him," the Khan says again, ruminatingly, absent-voicedly. "Only a boy and they killed him. He had no enemies." And to Shadrach's amazement the old man's lips begin to quiver and his eyes fill with tears. Eh? What's this? A show of some genuine emotion by Genghis Mao? A kind of quasi-paternal grief seizing the old man? But how can that be, considering the bleak fate Genghis Mao had himself intended for Mangu? Either yesterday's surgery has so enfeebled the Khan that he has grown uncharacteristically sentimental, suddenly entering an inconceivable dotage, or else Mordecai is misreading the signs: not grief but fear, cognizance of personal peril, awareness that if assassins could reach Mangu they might well find a way into the sanctum of Genghis Mao. That must be it. The Khan is angry and afraid, but because he is so diminished physically by his operation his anger and fear momentarily take the form of sorrow. And indeed, after a few moments more, Genghis Mao grows calm again, and says, in a low, controlled, newly resonant voice, "This is the first successful attack against our rule that we have experienced. It is unprecedented and must be met with force to demonstrate that we have lost none of our vigor and that our authority will not be undermined." He beckons Avogadro to his bedside and begins to dictate plans for mass arrests, wholesale interrogation of suspected subversives, tightened security measures both within the Grand Tower and in Ulan Bator in general. He sounds now less like a bereaved elder than a threatened despot. The loss of Mangu, it quickly becomes clear, means little or nothing to him personally. Mangu having been such a cipher, but it is a frightening omen of a breach in the power of his regime, and will require a reign of terror.

In the midst of these grim plans Genghis Mao suddenly looks up at Shadrach as if noticing him for the first time that morning, and says amiably, "You have nothing on but your trousers, doctor. Why is that?"

"I came here in a hurry. I got a tremendous jolt from the implants, strong enough to wake me up, and

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I knew there must be trouble."

"Yes. When Horthy brought me news of the assassination I became quite agitated."

"Your damned doors kept me waiting for five minutes, though. We ought to do something about that. Some day it'll be a critical matter for me to get to you in time, and Interface Three will give me the business again and it'll be too late."

"Mmm. We'll talk about that." The Khan eyes Shadrach's bare torso with some amusement and, it would seem, admiration, surveying the pronounced ridges of muscle down his belly, the long lean arms, the wide powerful shoulders. It is a pleasing body, Shadrach knows, trim and shapely and covered all over with smooth lovely chocolate skin, an athletic and graceful body, not much changed from the days nearly twenty years ago when he was a respectable college sprinter and passable basketball player, but nevertheless there is something weird and unnerving about this close inspection. After a moment the Khan says, sounding almost jolly, "You look very healthy, Shadrach."

"I try to keep in shape, sir."

"A wise doctor you are. So many of your profession worry about everyone's health except their own. But why were you still in bed at this hour of the morning?"

"I was in Karakorum late last night," Shadrach confesses.

Genghis Mao laughs explosively. "Dissipation! Debauchery! So that's how you keep in shape, is it?"

"Well—"

"At ease. I'm not serious." The Chairman's mood has changed astonishingly in these few minutes. This badgering banter, this light teasing—it is hard to believe that he was weeping for dead Mangu just a moment ago. "You can go and get your shirt, if you like. I think I can spare you for a few minutes, Shadrach."

"I'd prefer to stay a while longer, sir. It's not chilly this way."

"As you wish." Genghis Mao seems to lose interest in him. He turns back to Avogadro, still waiting by the bedside, and rattles off half a dozen more repressive measures to be put into effect at once. Then, dismissing the security chief, the Chairman summons Vice-Chairman Eyuboglu and outlines, seemingly impromptu, an elaborate program for the virtual canonization of Mangu: a colossal state funeral, a prolonged period of global mourning, the renaming of highways and cities, the erection of costly and imposing memorial monuments in every major capital. All this, for such a trifling boy? Why, Shadrach wonders? This is an outpouring of mortuary energy worthy of a demigod, an Augustus Caesar, a Siegfried, even an Osiris. Why? Why, if not that Mangu was a symbolic extension of Genghis Mao himself, his link to tomorrow,

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his hope of bodily reincarnation? Yes, Shadrach decides. In ordering this bizarrely inappropriate posthumous inflation of the murdered man, Genghis Mao must be mourning not Mangu but himself.

Was Mangu really murdered, though? Avogadro, waiting for Mordecai in the hallway when the doctor finally leaves Genghis Mao, is not so sure of that. The security chief, a bigboned, thick-bodied quick-witted man with cool eyes and a wide, quizzical mouth, draws Shadrach aside near the entrance to Surveillance Vector One and says softly, "Is he on any medication that might be making him mentally unstable?"

"Not particularly. Why?"

"I've never seen him as upset as this before."

"He's never had his viceroy assassinated before, either."

"What leads you to think there's been an assassination?"

"Because I—because Ionigylakis said—because—" Shadrach pauses, confused. "Wasn't there one?"

"Who knows? Horthy says he saw Mangu fall out the window. Period. He didn't see anyone pushing him. We've already run playback checks on all personnel scanners and there's no record of any unauthorized individual entering or leaving the entire building this morning, let alone having reached the 75th floor."

"Perhaps somebody was hiding up here overnight," Shadrach suggests.

Avogadro sighs. He looks faintly amused. "Spare me the amateur detective work, doctor. Naturally, we've looked through yesterday's records too."

"I'm sorry if I—"

"I didn't mean to be sarcastic. My point is simply that we've considered most of the obvious possibilities. It's not easy for an assassin to get inside this building, and I don't seriously believe that any assassins did. Naturally, that doesn't rule out the chance that Mangu was pushed by someone whose presence within the building would not seem unusual, as for example General Gonchigdorge, or you, or me—"

"Or Genghis Mao," Shadrach offers. "Tiptoeing from his bed and tossing Mangu through the window."

"You get the idea. What I'm saying is that anyone up here might have killed Mangu. Except that there's no evidence that anyone did. You know, whenever someone passes through a door up here, it's recorded. No one entered Mangu's bedroom this morning, either on the interface side or the elevator side. The tracking cores are absolutely blank. The last one to go in was Mangu himself, about midnight. Preliminary inspection indicates no traces of intruders in the room, no strange fingerprints, no flecks of someone else's dandruff,

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no stray hairs, no bits of lint. And no sign of a struggle. Mangu was a strong man, you know. He wouldn't have been easy to overpower."

"You're suggesting it was probably suicide?" Shadrach asks.

"I am. Obviously. No one on my staff takes any other theory at all seriously at this point. But the Chairman is certain it was an assassination, and you should have seen him before you got here. Almost hysterical, wild-eyed, raving. You know, it doesn't look good for me and my men if he believes there's been an assassination. We're supposed to make assassinations impossible up here. But it goes beyond whether I lose my job, doctor. There's this whole fantastic purge that he's instituting, the arrests, the interrogations, restrictive measures, a tremendously messy and unpleasant and expensive enterprise, all of it, so far as I can see, absolutely useless. What I want to know," Avogadro says, "is whether you think there's some chance the Chairman will be willing to take a more rational attitude toward Mangu's death when he's further along in his recovery."

"I don't know. But I don't think so. I've never seen him change his mind about anything."

"But the operation—"

"Has weakened him, sure. Physically *and* psychologically. But it hasn't greatly affected his reason in any way that I can perceive. He's always had this thing about assassins, of course, and obviously he's assuming Mangu was murdered because it fulfills some kind of inner need for him, some fantasy-projection, something very dark and intricate. I think he'd have made the same assumption even if he'd been in perfect health when Mangu went out the window. So his recovery *per se* isn't going to be a factor in getting him to reevaluate Mangu's death. All I can suggest is that you wait three or four days until he's strong enough to be getting back on the job and go in there with the findings of your completed investigation, show him conclusively that there's no evidence whatsoever of murder, and count on his basic sanity to bring him to an acceptance of the fact that Mangu killed himself."

"Suppose I bring him the report this afternoon?"

"He's not really ready for all this stress. Besides, is such a speedy investigation going to be plausible to him? No, I'd recommend waiting at least three days, preferably four or five."

"And meanwhile," Avogadro says, "suspects will be rounded up, minds will be pried into, the innocent will suffer, my staff will be wasting its energies on a foolish pursuit of a nonexistent assassin—"

"Can't you delay the purge a few days, then?"

"He ordered us to start at once, doctor."

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"Yes, I know that, but—"

"He ordered us to start at once. We've done so."

"Already?"

"Already. I understand the meaning of an order from the Chairman. Within the past ten minutes the first arrests have taken place. I can try to stretch out the process of interrogation so that as little harm as possible will come to the prisoners before I can bring my findings on Mangu's death to the Chairman, but I have no authority to sidetrack his instructions altogether." Quietly Avogadro adds, "I wouldn't want to risk it, either."

"Then there'll be a purge," Shadrach says, shrugging. "I regret that as much as you do, I suppose. But there's no way to stop it now, eh? And no real hope that you'll persuade Genghis Mao to swallow the suicide theory, not this afternoon or tomorrow or next week, not if he wants to think Mangu was murdered. I'm sorry."

"I am also," Avogadro says. "Well. Thanks for your time, doctor." He begins to move away; then, pausing, he gives Shadrach a deep, uncomfortably appraising look, and says, "Oh, one more thing, doctor. Is there any reason you might know of for Mangu to have wanted to kill himself?"

Shadrach frowns. He considers things.

"No," he answers after a moment. "No. Not that I'm aware of."

He goes on into Surveillance Vector One. The big room is crowded with high staff personnel. He begins to feel a little odd, wandering around headquarters without a shirt. General Gonchigdorge sits at Genghis Mao's ornate throne, jabbing with stubby fingers at the enormous keyboard that controls the whole vast spy-eye apparatus. As the general pounds the buttons, images of life out there in the Trauma Ward swing jerkily in and out of focus, zooming into view and vanishing rapidly. The scene on the screens looks just as dizzyingly random as when the machine is left to its own whims; not surprising, for Gonchigdorge really does seem to be tapping the keys without system, without purpose, in a kind of sullen petulance, as though he hopes to uncover a revolutionary cadre out there by some stochastic process of non-directed scoops—dipping down into the world here and there until he comes upon a band of desperados waving a banner, WE ARE CONSPIRATORS. But the screens reveal only the usual human story, people working, walking, suffering, quarreling, dying.

Horthy, appearing silently at Mordecai's left elbow, says, with a certain glee, "The arrests have already begun."

"I know. Avogadro told me."

"Did he tell you that they have a prime suspect?"

"Who?"

Horthy delicately prods his

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thumbs into the corners of his bulging, bloodshot eyes. A psychedelic effluvium still hovers about him. "Roger Buckmaster," he says. "The microengineering man, you know."

"Yes. I know. I've worked with him."

"Buckmaster was heard making wild statements at Karakorum last night," Horthy says. "Calling for the overthrow of Genghis Mao, yelling subversion at the top of his lungs. The Citpols picked him up, finally, but they decided he was just drunk and let him go."

In a low voice Shadrach says, "Is that what happened to you?"

"Me? To me? I don't understand what you mean."

"At the tube-train station. I saw you there, remember? While they were running that tape of Mangu's speech. You made some remarks about the Antidote-distribution program, and then the Citpols—"

"No," Horthy says. "You must be mistaken." His eyes fix on Shadrach's and lock there. They are intimidating eyes, cold and hostile, despite all their dissipated bleariness. With great precision Horthy says, "It was someone else you saw at Karakorum, Dr. Mordecai."

"You weren't there last night?"

"It was someone else."

Shadrach chooses to take the crude hint, and decides not to press the issue. "My apologies. Tell me about Buckmaster. Why do they think he's the one?"

"His eccentric behavior last night was suspicious."

"Is that all?"

"You'll have to ask the Security people for the rest."

"Was he found near Mangu's apartment at the time of the murder?"

"I couldn't say, Dr. Mordecai."

"All right." On the surveillance screens, in repellent close-up, the image of a girl vomiting. It is the crimson puke of organ-rot, in glistening lifelike color. Horthy seems almost to smile at the sight, as though nothing horrid is alien to him. Shadrach says, "One more thing. You saw Mangu fall, didn't you?"

"Yes."

"And then you notified Genghis Mao?"

"I notified the guards in the lobby, first."

"Of course."

"And then I went to the seventy-fifth floor. The Security people had already sealed it, but I was able to enter."

"Going straight to the Chairman's bedroom?"

Horthy nods. "Which was under triple guard. I obtained admittance only by insisting on my ministerial privileges."

"Was Genghis Mao awake?"

"Yes. Reading PRC reports."

"What would you say was his general state of health?"

"Quite good. He looked pale and weak, but not unusually so, consid-

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ering that he had just had a major operation. He greeted me and saw from my expression that something was wrong, and asked me, and I told him what had happened."

"Which was?"

"What else?" Horthy says snappishly. "That Mangu had fallen from his window, naturally."

"Is that how you put it? 'Mangu has fallen from his window'?"

"Something like that."

"Did you talk about his being pushed, maybe?"

"Why are you interrogating me, Dr. Mordecai?"

"Please. This is important. I need to know whether the Khan arrived at the idea that Mangu was assassinated by himself, or if you inadvertently put the suggestion in his mind."

Horthy stares balefully up at Shadrach Mordecai. "I told him exactly what I saw: Mangu falling from the window. I drew no conclusions about how it had happened. Even if someone had thrown him, how much could I have seen, 400 meters below? At that distance Mangu himself was no bigger than a speck against the sky, a doll. I didn't recognize him until he had nearly reached the ground." A disconcerting gleam appears in Horthy's eyes. He leans close to Shadrach and says, almost crooning, "He looked so serene, Dr. Mordecai! Floating there above me—his eyes wide open, his hair straight out behind him, his lips drawn back—he was smiling, I think. Smiling! And then he hit."

Ionigylakis, who has evidently been eavesdropping, interjects abruptly, "That's strange. If someone had just flung him from the window, would he have looked so cheerful?"

Shadrach shakes his head. "I doubt that Mangu was conscious at all by the time Horthy could see his face. That serene expression was probably just acceleration stupor."

"Perhaps," Horthy says crisply.

"Go on," Shadrach tells him. "You informed the Khan that Mangu had fallen. Then what happened?"

"He sat up so sharply that I thought he would break the medical machinery all around him. He turned red in the face and began to perspire. His breath came in gasps. Oh, it was very bad, Dr. Mordecai. I thought he would die from overexcitement. He started to wave his arms, to shout about assassins—suddenly he sank back against the pillow, he put his hands to his chest—"

"You thought he would die from overexcitement," Shadrach says. "But it never occurred to you beforehand that it might be unwise to trouble him with news like that, in his state of health."

"One doesn't think clearly at a time like that."

"One ought to, if one is in a position of high responsibility."

"One's judgment is not always

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perfect," Horthy retorts. "Especially when one has nearly been killed oneself a few minutes before by a body plummeting from the sky. And when one realizes that the dead man is such an important figure in the government, in fact the viceroy. And when one suspects that his death may be murder, assassination, the beginning of revolution. And when—"

"All right," Shadrach says. "All right. He managed to survive the unnecessary shock. But what you did was very risky, Horthy. Worse: it was dumb. Extremely dumb." He frowns. "You think there's some conspiracy, eh?"

"I have no idea. Clearly it's a possibility."

"So is suicide, though."

Ionigylakis says, "You think so, Shadrach?"

"Avogadro certainly does."

"But Avogadro's men have arrested Buckmaster."

"I've heard. The poor crazy devil. I pity him." Gonchigdorge is still jabbing buttons. The screens are full of weirdly distorted faces, as though the spy-eye lenses are getting much too close to their targets. Donna Labile, from the far side of the room, calls to Horthy, who gives Shadrach a frosty incomprehensible look and stalks away. Shadrach is altogether unable to make sense out of Horthy, but suddenly it does not matter. Nothing matters. This room is a madhouse, through which he wanders, bare-chested and feeling a bit of a chill, baffled by all the frantic activity around him. He feels too sane, too mundane, for this environment. The screens of Surveillance Vector One suddenly go blank, and then grow bright with wild jagged streaks of blue and green and red. General Gonchigdorge, in his heavy-handed pursuit of conspirators, has broken something. "Ficifolia!" the general yells. "Get Frank Ficifolia up here! The machine has to be repaired!"

Ficifolia is already present, though. Cursing softly, he shoulders through the crowd toward the enthroned general. As he passes Shadrach he pauses to murmur, "Your friend Buckmaster's in the quiz room right now. I suppose you won't weep over that."

"On the contrary. Buckmaster wasn't in his right mind when he was hassling me last night. And now he'll pay for it."

"Avogadro himself is interrogating, I hear."

"Avogadro thinks it was suicide."

"So do I," Ficifolia says, and keeps going.

Shadrach has had enough. He heads for the interface. As he reaches it, he looks back at the turmoil, the blaring jags of color on the screens. Gonchigdorge shouting like an angry child, Horthy and Labile deep in some mysterious intense discussion punctuated by fierce Italo-Magyar gesticulations, Ionigylakis looming above everyone

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and announcing his confusions in booming tones, Frank Ficifolia squatting by an open panel to insert a long slender wrench into a turbulent spaghetti of bubble-circuits. While somewhere in the depths of this huge building Avogadro, who does not believe a murder was committed, is nevertheless preparing to administer torture to Roger Buckmaster, suspected of having committed that murder, even though Buckmaster almost certainly could not have been capable of murdering anyone this morning. And in the great bedchamber of the Khan that old, old man, his near-fatal episode of shock all but over according to the tickety-tock pulsations and quivers running through Shadrach Mordecai's body, lies in bed scheming with calm crazy dedication how best to make sacred the memory of the departed viceroy and how to destroy his supposed slayers. Enough, enough. More than enough: too much. Shadrach requests exit from the interface, which opens with blessed promptness and admits him to the holding chamber, and then, quickly, to his own apartment on the far side.

How peaceful it is here! Crowfoot is awake and out of the hammock; she has just taken a shower, and stands, bare, beautiful, in the middle of the room, drying herself, droplets of moisture still glittering on her smooth sleek skin. "I'm going to be awfully late getting to the lab today," she says casually. "What's been happening?"

"Everything. Mangu's dead, the Khan nearly had apoplexy when he found out, they've arrested Buckmaster, a general purge of subversives has been ordered. Horthy is—"

"Wait," she cries, blinking. "Dead? Mangu? How?"

"Fell out the window. Pushed or jumped."

"Oh." A little sucking intake of breath. "Oh, God. When was this?"

"Half an hour ago, more or less."

She crumples her towel into a ball, hurls it into a corner, begins to pace the room, striding like a splendid perplexed tigress. Whirling on him, she demands, "Which window?"

"His own," he tells her, mystified by the drift of her questions.

"Fell from the top of the building? His body must have been smashed to a ruin."

"I imagine so. But what—"

"Oh, Shadrach! My project!"

"What about it?"

"This sounds terribly inhuman, doesn't it? But what will happen to my project now? Without Mangu—"

"Oh," he says dully. "I hadn't considered that."

"He was intended for—"

"Yes. Don't say it."

"It's awful of me to have that reaction."

"Was the entire project built

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about Mangu as the specific particular one—the recipient—?"

"Not necessarily. But—oh, to hell with the project!" She crouches near the floor, folding her arms across her breasts. She is shivering. "I don't understand. Who would kill Mangu, anyway? What's going on? Is there going to be a revolution, Shadrach?"

"Mangu may have killed Mangu," he tells her. "No one knows yet. Avogadro's men didn't detect any sign of forced entry to his apartment."

"Yet they've arrested Buckmaster?"

"Because of the nonsense he was spouting last night in Karakorum, I suppose. But they haven't arrested Horthy, who was being just as subversive. Horthy's right next door in Surveillance Vector One. He was the one who brought the news about Mangu to Genghis Mao. Damn near killed him with the shock of it."

Nikki, looking up somberly, says, "Perhaps that's what he wanted to do."

Things grow calmer. The messages from the interior of Genghis Mao indicate that the medical crisis is past. The Khan is healing, the morning's upheavals will have no serious impact. Here at noon, Shadrach Mordecai at last dresses for the day, neutral gray doctor-clothes. He feels rootless, disoriented: too much sleep, after all these months of insomnia, the nap in Nikki's arms in Karakorum and then the long, emergency-interrupted spell in the hammock, and now his mind is foggy. But he'll fake it through the day, somehow.

Heading for his office, he passes as usual through Surveillance Vector One, much quieter now than it was fifteen or twenty minutes before. The high panjandrums are gone, Gonchigdorge and Horthy and Labile and that crowd, and no one remains except three underlings, a Citpol man and a couple of Avogadro's lieutenants, who stare moodily at the jumpy mosaic flitting across the hundreds of screens. Their eyes glazed. Informational overkill, it is. They see so much that they know not what they see.

Bypassing Committee Vector One—Shadrach has no yearning to intrude on the politicos this tense morning—he takes the long route to his office, via Genghis Mao's own vacant office and the Khan's majestic dining room. It is, as always, comforting to be among his familiar talismans, his books, his collection of medical instruments. He wanders from case to case, getting himself together. Picks up his devaricator, sinister splay-elbowed forceps used to pry open wounds. Thinks of Mangu, splattered against the terrazzo pavement; banishes the thought. Examines the hacksaw with which some eighteenth-century surgeon accom-

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plished amputations. Thinks of Genghis Mao, livid, beady-eyed, ordering mass arrests. *Off with their heads!* That may be next; why not? Fondles a fifteenth-century anatomical doll from Bologna, elegant ivory homunculus, female—what is the feminine of homunculus, he wonders? Homuncula? Feminacula?—the belly and breasts of which lift away at the push of a fingertip, revealing heart, lungs, abdominal organs, even a fetus crouching in the uterus like a kangaroo in the pouch. And the books, oh, yes, the precious musty books, formerly owned by great doctors of Vienna, Montreal, Savannah, New Orleans. Valesco de Taranta's *Philonium Pharmaceuticum et Cheirurgicum*, 1599: Martin Schurig's *Gynaecologia Historico-Medica*, 1730, rich with details of defloration, debauchery, penis captivus, and other wonders! Here is old Rudolf Virchow's *Die Cellularpathologie*, 1852, proclaiming that every living organism is "a cell state in which every state is a citizen," that a disease is "a conflict of citizens in this state, brought about by the action of external forces." *Aux armes, citoyens!* What would Virchow have said of transplanted livers, borrowed lungs? He'd call them hired mercenaries, no doubt: the Hessians of medical metaphor. At least they fight fair in the cellular wars, no sneaky defenestrations, no snipers on the overpass. And this huge book: Grootdoorn, *Iconographia Medicalis*, luscious old engravings—see, here, Saints Cosmas and Damian in this sixteenth-century portrait, shown grafting the dead Moor's leg to the cancer victim's stump. Prophetic. Transplant surgery circa A.D. 500, performed posthumously, no less, by the saintly surgeons. If I ever find the original of that print, Shadrach thinks, I'll give it to Warhaftig for Hanukkah.

He spends half an hour updating Genghis Mao's medical file, dictating a report on the liver operation, adding a postscript about this morning's brief alarm. Someday the printout of the Genghis Mao dossier is going to be a medical classic, ranking with the Smith Papyrus and the *Fabrica*, and he toils conscientiously over it, preparing his place in the history of his art. Just as he finishes the account of the current episode Katya Lindman phones him.

"Can you come down to the Talos lab?" she asks. "I'd like to show you our latest mock-up."

"I suppose so. You've heard about Mangu?"

"Of course."

"You don't sound very concerned."

"What was Mangu? Mangu was an absence. Now the absence is absent. His death was more of an event than his whole existence."

"I doubt that he saw things that way himself."

"You are so compassionate, Sha-

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drach," she says in the flat voice that he knows she reserves for mockery. "I wish I shared your love of mankind."

"I'll see you in fifteen minutes, Katya."

Her laboratory is on the ninth floor of the Grand Tower, a cluttered place festooned with cables, connectors, buses, coaxials, crates of bubble-chips, enough electronic gear to throttle a brontosaur. Out of this chaotic maze of matériel Lindman materializes, coming toward him in her customary slashing headlong stride. She is all business, very much the bustling woman of science. She wears a white blouse, a lavender lab jacket open at the throat, a short brown tweed skirt. The effect is severe, stark, and harsh. Mitigated neither by the bare thighs nor the tightness of the skirt. Lindman is not a woman who works at projecting sexuality. Nor does she need to, with Shadrach; she holds a malign physical authority over him, the source of which he does not comprehend. He feels always when he is with her that he must be on guard—against what, he is not sure.

"Look," she says triumphantly, with a broad sweeping gesture.

He follows her pointing arm halfway across the laboratory to the one uncluttered place, a kind of dais, on which, under a dazzling spotlight, the current working model of the Genghis Mao automaton sits enthroned. A single thick yellow-and-red cable runs to it from a power unit. The automaton is half again as large as life, a massive imitation of the Chairman, plastic skin over metal armature; the face is an altogether convincing replica, the shoulders and chest look plausibly human, but below the diaphragm the robot Genghis Mao is an incomplete thing of struts and wires and bare circuitry, skinless and lacking even the internal mechanical musculature that fills its upper half. As Shadrach watches, the ersatz Chairman extends its right arm toward him and, with an altogether human impatient little flip of its hand, beckons him forward.

"Go ahead," Katya Lindman says.

He advances. When he is three or four meters away he halts and waits. The robot's head slowly turns to face him. The lips pull back in a cruel grimace—no, a grin, unmistakably a grin, the bleak and terrible grin of Genghis Mao, that self-congratulatory smirk, slowly forming at the corners of the leathery cheeks, a regal grin, a monstrous overbearing grin. Imperceptibly the features rearrange themselves, without apparent transition; the robot now is scowling, and the wrath of Genghis Mao darkens the room. *Off with their heads*, yes, indeed. And then a smile. A cold one, for there is no other sort from Genghis Mao, but yet it is a smile that puts one at

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one's ease, Arctic though it is; and the smile of the robot is an uncanny replica of the smile of Genghis Mao. And, lastly, the wink, the famous wink of the Khan, that sly, disarming dip of the eyelid that cancels all the seeming ferocity, that communicates a redeeming sense of perspective, of self-appraisal: *Don't take me so seriously, friend, I may not be the megalomaniac you think I am.* And then, just as the wink has achieved its effect and the terror that Genghis Mao can generate with a glance has subsided, the face returns to its original expression, icy, remote, alien.

"Well?" Lindman asks, after some while.

"Doesn't he speak?"

"Not yet. The audio is trivial to accomplish. We aren't bothering with it just now."

"That's the whole show, then?"

"That's it. You sound disappointed."

"Somehow I expected more. I've seen him do the grin already."

"But not the wink. The wink is new."

"Even so, Katya—you add a feather here and there, but you still don't have an eagle."

"What did you think I'd show you? A walking, talking Genghis Mao? The complete simulacrum overnight?" His disappointment has angered her, obviously: her mouth works tensely, the lips drawing back from the gums again and again, baring those pointed carnivorous incisors. "We still are in preliminary stages, here. But I thought you would like the wink. I like the wink. I rather do like the wink, Shadrach." Her voice grows lighter, her features soften; he can almost hear the gears shifting within her. "I'm sorry I wasted your time. I was pleased with the wink. I wanted to share it with you."

"It's a fantastic wink, Katya."

"And, you know, Project Talos will become much more important with Mangu gone. Everything that Dr. Crowfoot has been doing was aimed toward integrating the Chairman's personality with the neural responses of Mangu's living mind and body, and that's over with, now, that whole approach must be discarded."

Shadrach knows enough about Nikki's work to know that this is not literally so; apparently Mangu was indeed the template against which the Avatar personality-coding program was being plotted, but there was nothing inexorable about the use of Mangu; with the appropriate adjustments the project can readily be reshaped around some other body-donor. But there is no need to tell Lindman that, if she wants to feel that her project, peripheral so far, has suddenly become Genghis Mao's prime hope of post-mortem survival. She has made an obvious effort in the past minute or two to be less intimidating, less abrasive, and he

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prefers her that way; he will do nothing that might spur new tension and defensiveness in her.

In fact her mood has eased so much that she seems almost coquettish. Chattering in a shrill, girlish, wholly un-Katyaesque way, she leads him on a hectic and gratuitous tour of the laboratory, displaying circuit diagrams, boxes of memory chips, prototypes for the pelvis and spine of the next model of Genghis Mao, and other bits of Project Talos that are of no conceivable significance just now; and he realizes, after a time, that her only pretext for doing all this is to detain him, to have a few minutes more of his company. It puzzles him. Lindman's usual manner is aggressive and peremptory, but now she is coy, flirtatious, sidling up unsubtly to him, plenty of heavy breathing and forthright eye contact, actually grazing his elbow with her breasts as they stand close together rummaging through a table full of schematics. Does she think that such stuff will make him snort, sweat, paw the ground with his hooves, fling himself upon her? He has no idea what she thinks. He rarely does. Nor is he going to find out now, for whatever she is organizing here is truncated abruptly by a squeaky summons from his pocket-beeper, tracking him through the building. He activates his portable telephone. Avogadro is calling.

"Can you come to Security Vector One, Doctor Mordecai?"

"Now?"

"If you would."

"What's happening?" Shadrach asks.

"We've been interrogating Buckmaster. Your name has arisen."

"Oh. *Oh.* Am I a suspect too, now?"

"Hardly. A witness, perhaps. Can we expect you in five minutes?"

Shadrach looks at Katya, who is flushed, excited. "I have to go," he says. "Avogadro. Something about the Mangu inquiry. It sounds urgent."

Her face darkens. Her lips compress. But she says only that she hopes to see him again soon, and, hiding her disappointment behind a mask of disappointment, she releases him. As he leaves the laboratory he feels his entire body expand, as though it had been held under great pressure while he was with her.

Security Vector One is on the sixty-fourth floor. Mordecai has never had occasion to go there, and he has little idea what to expect, other than standard police paraphernalia—magnifying glasses and fingerprint pads all over the place, no doubt, photos of known subversives mounted on tacky boards, sheafs of dossiers and transcripts, rows of tap-terminals and fiber-eyes, whatever things detectives would be likely to use in protecting the physical persons of Genghis Mao and the PRC. Perhaps such

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things are there, but Shadrach gets no glimpse of them. A feline, soft-voiced young man, Oriental but too sinuous to be a Mongol, probably Chinese, greets him at the reception desk and guides him through a labyrinth of blank-walled hallways, past a nest of tiny offices where weary-looking bureaucrats sit at desks heaped with paper. The place could be the headquarters of an insurance company, a bank, a brokerage house. Only when he is ushered into the interrogation cell where Avogadro and Buckmaster are waiting for him does he feel that he is among the enforcers of the law.

The room is artfully claustrophobic, rectangular and windowless, with dirty green walls and a low, oppressive ceiling from which short-stalked spotlights dangle at the ends of jointed metal arms. The spotlights are trained on the forehead of Roger Buckmaster, who sits uncomfortably slouched in a squat, hard narrow chair with broad aluminum armpieces and a high backrest. Electrodes are taped to Buckmaster's wrists and temples; their leads disappear into the recesses of the backrest. Buckmaster looks unnaturally pale, sweaty, blotchy-faced; his eyes are glassy; his lips are slack. Clearly Avogadro has been working him over for some while.

Avogadro, who is standing next to Buckmaster as Shadrach enters, looks little better—grim, harried, frayed. "A madhouse," he mutters. "Fifty arrests in the first hour. We have every interrogation cell full and they're still coming in. Lunatics, beggars, thieves, all the riffraff of Ulan Bator. And the radicals, of course. I go from cell to cell, cell to cell. And for what? For what?" A rough-edged laugh. "There'll be plenty of meat for the organ farms before this is over." Slowly, moving his heavy frame as though doubled gravity drags it down, he turns to the man in the chair. "Well, Buckmaster? You have a visitor. Do you recognize him?"

Buckmaster stares at the floor. "You know bloody well I do."

"Tell me his name."

"Let me be."

"Tell me his name," Avogadro urges in a tone that is tired but menacing.

"Mordecai. Shadrach Bloody Mordecai. Em Dee."

"Thank you, Buckmaster. Now tell me when you last saw Dr. Mordecai."

"Last night," Buckmaster says, his voice a feeble fluting thing, barely audible.

"Louder?"

"Last night."

"Where?"

"You know where, Avogadro!"

"I want you to tell me yourself."

"I already have."

"Again. In front of Dr. Mordecai. Tell me."

"Why don't you just carve me up and be done with it?"

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"You're making this hard for yourself, Buckmaster. You're also making it hard for me."

"Pity."

"I have no choice about this," Avogadro says.

Lifting his head, Buckmaster manages a cold, sullen, furious glare. "Do I? Do I? Oh, I know the game. You'll question me for a while, you'll find me guilty of conspiracy, you'll sentence me to death, and off I go to the organ farm, right? Right? And there I lie, a corpse that isn't dead, so that whenever Genghis Mao needs a lung, a kidney, a heart, someone can come and cut out mine, right? While I lie there, dead, warm, breathing and metabolizing, part of the stockpile."

"Buckmaster—"

Buckmaster chuckles. "Genghis Mao thinks the stocks are getting low, and he can't use the miserable organ-rotted people out there, so he turns on us, he tosses a few dozen of his own people to the farms, right? Very well, take me away! Turn me into cannibal food! But let's end this farce fast, shall we? Stop asking me idiotic questions."

Avogadro sighs. "To continue. You saw Dr. Mordecai at—"

"Timbuktu."

Avogadro lifts his left hand. A Security man sitting at a table in the farthest corner does something to a control console in front of him; Buckmaster jerks and twitches and the left side of his face goes into a brief ugly spasm.

"You saw him where?"

"Piccadilly Circus."

Again the left hand, higher. Again the touching of controls; again the facial spasm, much worse. Shadrach Mordecai shifts his weight uneasily from foot to foot. In a low voice he says, "Possibly it isn't necessary to—"

"It's necessary, yes," Avogadro tells him. "The forms must be observed." To Buckmaster he says, "I'm prepared to keep this up all day. It bores me, but it's my job, and if I have to hurt you, I'll hurt you, and if you make me cripple you, I'll cripple you, because I have no choice. Do you understand? *I have no choice.* Now, again: you met Dr. Mordecai in—"

"Karakorum."

"Where in Karakorum?"

"Outside the transtemporalists' tent."

"About what time?"

"I don't know. Late, but it was before midnight."

"Dr. Mordecai, is this correct? Your answers will be recorded."

"It's all correct so far," Shadrach says.

"Good. Go on, Buckmaster. Tell me what you told me before. You encountered Dr. Mordecai and you said what to him?"

"I spoke a lot of bloody nonsense."

"What kind of nonsense, Buckmaster?"

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"Foolish talk. The transtemporalists jumbled my mind with their drugs."

"What exactly did you say to the doctor?"

Buckmaster, silent, stares at the floor.

The right hand of Avogadro rises almost to his shoulder. The controls are adjusted. Buckmaster leaps in his seat as though speared. His right arm thrashes about like an infuriated snake.

"Tell me, Buckmaster. Please."

"I accused him of doing evil."

"Go on."

"I called him a Judas."

"And a black bastard," Shadrach says.

Avogadro, with a gentle nudge, indicates to Shadrach that his prompting is unwelcome.

"Specifically, Buckmaster, what did you accuse Dr. Mordecai of doing?"

"Of doing his job."

"Meaning what?"

"His job is keeping the Chairman alive. I said he's responsible for keeping Genghis Mao from having died five years ago."

Avogadro says, "Is that correct, Dr. Mordecai?"

Shadrach hesitates. He doesn't particularly want to cooperate in sending Buckmaster to the organ farm. But it would be folly to try to protect the little man now. The truth about last night's incident in Karakorum has already been drawn forth and recorded, he knows. Buckmaster is condemned out of his own mouth. No lie can save him, but only imperil the liar even further.

"It is," he says.

"So. Buckmaster, do you regret that Genghis Mao didn't die five years ago?"

"Let me be, Avogadro."

"Do you? Do you truly want the Chairman to be dead? Is that your position?"

"I had the drug in my head!"

"You don't have the drug in your head now, Buckmaster. What are your feelings about Genghis Mao at this moment?"

"I don't know. I simply don't know."

"Hostile?"

"Perhaps. Look, Avogadro, don't force any more out of me. You have me, you'll give me to the cannibals tonight, isn't that enough for you?"

"We can end this as soon as you cooperate."

"Very well," Buckmaster says. He pulls himself upright, finding some remaining resource of dignity. "I don't care for the regime of Genghis Mao. I am not in general agreement with the policies of the PRC. I regret having devoted so much effort to their service. I was overwrought last night and I said a lot of foul things to Dr. Mordecai for which I feel shame today. *But.* But, Avogadro! But I have never done anything disloyal. And I don't know a thing about the death of

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Mangu. I swear I had no part in it."

Avogadro nods. "Dr. Mordecai, did the prisoner mention Mangu last night?"

"I don't think he did."

"Can you be more positive about that?"

Shadrach considers. "No," he says finally. "To the best of my recollection, he said nothing about Mangu."

"Did the prisoner make any threats against the life of Genghis Mao?"

"Not that I recall."

"Try to remember, doctor."

Shadrach shakes his head. "You have to understand, I had just come out of the transtemporalists' tent myself. My mind was still elsewhere during most of Buckmaster's tirade. He did speak critically of the government, yes, quite strongly, but I don't think there were any direct threats. No."

"I should refresh your memory, then," Avogadro says, gesturing to his assistant in the corner. There is a hissing sound, and then, from an invisible speaker, the sound of a voice, strangely familiar but oddly strange. His own.

—This is suicidal, the way you're carrying on. There'll be a report of all this on the Chairman's desk tomorrow, Roger, more likely than not. You're destroying yourself.

—I'll destroy him. *The bloodsucker. He holds us all for ransom, our bodies, our souls—*

"Again," Avogadro says. "That last bit."

—I'll destroy him. *The bloodsucker. He holds us all for—*

"Do you recognize those voices, doctor?"

"Mine. Buckmaster's."

"Thank you. The identification is important. Who was it who said, 'I'll destroy *him?*' "

"Buckmaster."

"Yes. Thank you. Buckmaster, was that your voice?"

"You know it was."

"Making a threat against the life of Genghis Mao?"

"I was overwrought. I was making a rhetorical point."

"Yes," Shadrach Mordecai says. "That's how it seemed to me. I urged him not to shout nonsense. I can't see it as any kind of serious threat. You have a tape of the whole conversation?"

"The whole thing," Avogadro says. "Many conversations are taped, you know. And automatically screened for subversion. The computers brought this to our attention early this morning. The voiceprints told us it was you and Buckmaster, but of course your direct corroboration is useful—"

"As though you'll have a trial, a jury, lawyers," Buckmaster says bitterly. "As though I won't be meat by nightfall!"

"He didn't say anything about Mangu to me last night, did he?" Shadrach asks.

"No. Nothing on the tape."

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"As I thought. Then why hold him?"

"Why defend him, doctor? According to the tape, he was insulting and offensive to you."

"I haven't forgotten. Nevertheless. I hold no grudges. He was a nuisance to me last night, but being a nuisance shouldn't be enough to make me want to see him sent to the organ farms."

"Tell him again!" Buckmaster cries. "Oh, God, tell him!"

"Please," Avogadro says. Buckmaster's outburst appears to give him pain. He signals to his man, and Buckmaster is unstrapped, freed of the electrodes, helped to his feet, led from the room. At the door Buckmaster pauses and looks back, face bleary, distorted with fear. His lips tremble; in a moment he will be sobbing. "I'm not the one!" he cries, and the Security aides haul him away.

"He isn't." Shadrach says. "I'm sure of that. He was out of his mind last night, ranting and screaming, but he's no assassin. A malcontent, maybe. But no assassin."

Avogadro, sinking limply into the interrogation chair, plays with the electrodes, winding the snaky leads around his fingers. "I know that," he says.

"What will happen to him?"

"The organ farm. Probably before morning."

"But why?"

"Genghis Mao's reviewed the tape. He regards Buckmaster as dangerous."

"Christ!"

"Go argue with Genghis Mao."

"You sound so calm about it," Shadrach says.

"It's out of my hands, doctor."

"We can't just let him be murdered!"

"We can't?"

"I can't."

"If you want to try to save him, go ahead. I wish you well."

"I might try. I might just."

"The man called you a black bastard," Avogadro says. "And a Judas."

"For that I should let him be vivisected?"

"You aren't *letting* anything. It's just happening. It's Buckmaster's problem. Not mine, not yours."

"No man's an island, Avogadro."

"Haven't I heard that before somewhere?"

Shadrach stares. "Aren't you at all concerned? Don't you give a damn about justice?"

"Justice is for lawyers. Lawyers are an extinct species. I'm only a security officer."

"You don't believe that, Avogadro."

"Don't I?"

"Christ. Christ. Don't come on with that I'm-just-a-cop routine. You're too intelligent to mean it. And I'm too intelligent to take it at face value."

Avogadro sits up. He has coiled two of the leads around his throat

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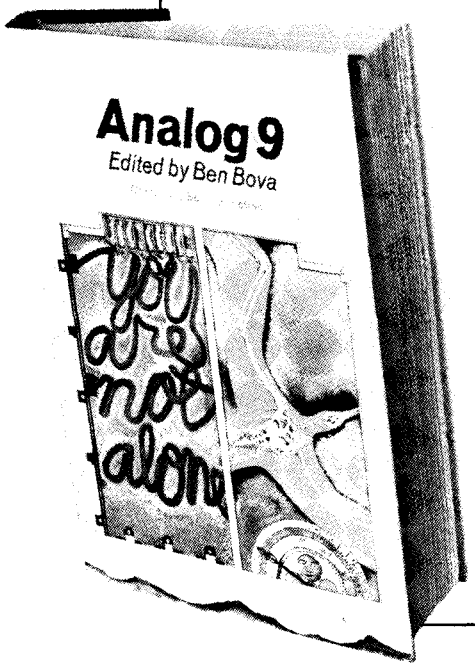

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in a bizarre clownish way, and his head is tilted to one side, like that of a hanged man. "Do you want me to play you the Buckmaster tape? There's a place on it where you tell him that it's not our fault the world is the way it is, that we accept our karma, that we all serve Genghis Mao because he's the only game in town. The alternative is organ-rot, nez-pah? Therefore we dance to the Khan's tune, and we don't ask questions of morality, neither do we unduly search our souls over matters of guilt and responsibility."

"I—"

"Wait. *You* said it. It's on the tape, *dottore.* Now I say it to you. I've forfeited the luxury of having personal feelings about the righteousness of sending Bucky to the organ farm. By entering the Khan's service I've given up the privilege of having qualms."

"Have you ever seen an organ farm?"

"No," Avogadro says. "But I hear—"

"I've seen them. Long quiet room, like a hospital ward, but *very* quiet. Except for the burble of the life-support machinery. Double row of open tanks, wide aisle between them. One body in each tank, floating in warm blue-green fluid, a nutrient bath. Intravenous tubes all over the floor, like pink spaghetti. Dialysis machines between each pair of tanks. Before they put a body in its tank, they kill the brain—spike through the foramen magnum, *zap*—but the rest stays alive, Avogadro. Vegetable in animal form. God knows what it perceives, but it lives, it needs to be fed, it digests and excretes, the hair grows, the fingernails, the nurses shave and groom the bodies every few weeks, and there they lie, arranged neatly by blood type and tissue type, available, gradually being stripped of limbs and organs, a kidney this week, a lung the next, sliced down to torsos in easy stages, the eyes, the fingers, the genitalia, eventually the heart, the liver—"

"So? What's your point, doctor? That organ farms aren't pretty places? I know that. But it's an efficient way to maintain organs awaiting transplant. Isn't it better to recycle bodies than to waste them?"

"And turn an innocent man into a zombie? Whose only purpose is to be a living storage depot for spare organs?"

"Buckmaster isn't innocent."

"What's he guilty of?"

"Guilty of bad judgment. Guilty of bad luck. His number's up, doctor." Avogadro, rising, lays his hand lightly on Shadrach's arm. "You're a man of conscience, aren't you, *dottore?* Buckmaster thought you were a cynical fiend, a soulless servant of the Antichrist, but no, no, you're a decent sort, caught in a nasty time, doing your best. Well, doctor, so am I. I quote your own words of last night: *Guilt is a lux-*

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ury we can't afford. Amen! Now go. Stop worrying about Buckmaster. Buckmaster's done himself in. If you hear the bell tolling, remember, it tolls for him, and it doesn't diminish you or me at all, because we've already diminished ourselves as much as possible." Avogadro's smile is warm, almost pitying. "Go, doctor. Go and relax. I have work to do. I have a dozen more suspects to question before dinner."

"And the real murderer of Mangu—"

"Was Mangu himself, nine to one. What's that to me? I'll continue to find his killer and interrogate him and ship him to the organ farms until I'm told to stop. Go, now. Go. Go."

TO BE CONTINUED

The AnLab is your chance to tell us which stories you like best, and thereby reward your favorite authors with solid cash. It works this way: send us a card or letter with a list of the stories in each month's issue, ranked in the order in which you preferred them. We average the votes and publish the results here. The story that comes closest to having an average of 1.00 (which would mean it received a first-place vote from everyone voting) earns its author an extra one cent a word: $100, in the case of a 10,000-word novelette. The story in second place receives a half-cent extra per word.

The Analytical Laboratory, May 1976

PLACE	TITLE	AUTHOR	POINTS
1	....Minotaur in a Mushroom Maze, Part I	*Richard and Nancy Carrigan*	2.148
2	....Projections	*Stephen Robinett*	2.234
3	....This, Too, We Reconcile	*John M. Ford*	3.468
4	....Speculation	*George O. Smith*	3.851
5	....The Prince in Metropolis	*Gordon Eklund*	4.148

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AN INTERVIEW WITH **CARL SAGAN**

JOSEPH F. GOODAVAGE

"There is a place with four suns in the sky—red, white, blue and yellow; two of them are so close together that they touch, and star-stuff flows between them. I know of a world with a million moons. I know of a sun the size of the Earth—and made of diamond. There are atomic nuclei a few miles across which rotate thirty times a second. There are tiny grains between the stars, with the size and atomic composition of bacteria. There are stars leaving the Milky Way, and immense gas clouds falling into it. There are turbulent plasmas writhing with X and gamma rays and mighty stellar explosions. There are, perhaps, places which are outside our Universe. The universe is vast and awesome, and for the first time we are becoming part of it."

Carl Sagan,
The Cosmic Connection

(Dr. Sagan is Professor of Astronomy and Space Sciences and Director of the Laboratory for Planetary Astronomy at Cornell University.)

Q. You have some rather strong views about the way science is handled in the popular press. Would you like to elaborate?

C.S. Indeed. Science is so exciting today that I don't think it's necessary to embellish it or distort it in order to blow the minds of the readers. It's already mind-blowing enough. Such distortion doesn't convey the real excitement of science, and worse yet it encourages habits of sloppy and uncritical thinking in young readers. My frequent experience is that there is a vast popular audience enthusiastic about science, and much more willing to delve deeply than the press or TV give them credit for.

Q. There are several very interesting predictions made by Immanuel Velikovsky that turned out to be true and I'd like your reaction to them. First, he predicted the existence of the Van Allen radiation belt surrounding the Earth; the enormous radiation belt around Jupiter; he predicted that Mars would be found to be cratered like the Moon; he anticipated the high temperature of Venus; he also predicted that Venus would be found

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to be rotating in a retrograde motion beneath its dense layer of clouds, and a series of things most of which were completely against the beliefs of the astronomers at that time. What do you make of all that proven data?

C.S. I make of it that Velikovsky has made a lot of wrong predictions and a few right quotations from the scientific literature. The correct quotations have been stressed and the wrong predictions have not. The right "predictions"—almost all of them—turn out to have been made by other people before Velikovsky, some of them by people whom Velikovsky himself makes reference to in his book. For example, the idea of Venus being very hot: Rupert Wildt wrote a paper in 1940 which proposed that the carbon dioxide content of the Venus atmosphere would produce a greenhouse effect which would make it much hotter than people had thought. 1940 was ten years before Velikovsky's *Worlds in Collision* came out. The credit belongs to Wildt, not to Velikovsky. And that's the situation for most of the so-called 'correct predictions.' Some *clever* scientist saw the correct situation earlier and Velikovsky quoted him—incidentally, not always giving proper credit.

Q. And conversely, is it not also true that throughout the history of astronomy there were hundreds of wrong opinions about the size of a star, the temperature gradient of a planet, its gravitational pull, retrograde motion or whatever, and yet isn't it true that all we are given to know are the astronomers' triumphant right guesses?

C.S. The progress of science is littered with dead theories; they were maladapted. But the advantage of science is that scientists—if they are any good—are willing to reject the bad ideas in favor of the good ones; that's the way progress is made. This self-correcting aspect of science is one I'd like to see more generally applied. I'd like to see politicians willing to admit that their ideas have been wrong and now they'll adopt new ones which work better. And I'd like to see popular writers of science like Velikovsky adopt similar positions. There must be a hundred items that Velikovsky was wrong on. I'd be very interested in seeing Velikovsky write a paper about all the things he was wrong about.

Q. Then, you're saying everyone should reject EVERYTHING Velikovsky wrote?

C.S. No, I don't *at all* say that one should dismiss out-of-hand the things that Velikovsky says. It's only to be dismissed *after* you read it, not *before.* I've written a 90-page detailed critique of *Worlds in Collision.* (Unfortunately there were scientists who dismissed it before they read it.) The idea of looking at the old legends of the Earth, believing some of them and looking for

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cross-correlations, and deducing some natural events from them seems to me not at all an implausible method of proceeding. But when the conclusions are at variance with facts we know much more reliably—deductions, say, from the great conservation laws of physics—then we must be skeptical about conclusions drawn from myths.

Q. If you say it *doesn't* seem implausible, then you differ from Velikovsky's chief critics, because they claimed historical records were unreliable and therefore scientifically unacceptable.

C.S. I think what they really are saying is that the method's unreliable, not unacceptable. I can imagine a situation where you had a very striking legend which was independently held by many diverse civilizations that you were sure had no contact with each other, and which clearly pointed to an astronomical or cosmological event about which those civilizations could have had no prior knowledge. Why, I'd be absolutely prepared to accept that such an event *had* occurred—*if* I could convince myself about the prior conditions I just mentioned. In principle there's nothing wrong with going about it that way, but you have to bear in mind that it's much riskier. Societies *do* trade legends, time scales *are* out of kilter, a story *can* have other explanations than an astronomical event.

Q. Alright. What is the likelihood of a planetary imbalance of any kind where a planet could be slowed in rotation, pulled out of orbit—any of those things Velikovsky spoke of?

C.S. I think it's extraordinarily unlikely at the present time in the history of the solar system. There must have been many such events four billion years ago when the solar system was still in the process of formation, when there were a lot more colliding objects around. But the situation is very different today. Velikovsky's idea that a comet braked the Earth's rotation to a halt, and that the Earth later, somehow, started up again with the same length of the day is just plain silly—and ignores the conservation of angular momentum. It's quite clear that we understand enough about celestial mechanics to exclude some of the events in *Worlds in Collision.* Velikovsky has to invent *ad hoc* explanations to get around the celestial mechanics—nongravitational forces, magnetic forces, and so on. The details of these new forces are never worked out, but there's plenty of handwaving.

Q. Freeman J. Dyson claims that 'the time scale for industrial and technological development for societies of alien beings is likely to be very short in comparison to the time scale of stellar evolution.' He says it's probable that alien societies might be millions of years

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old, with science and technology of an unimaginably superior level. Their cultures, he says, will have been expanded to the limits of Malthusian principles. Suppose we suddenly made contact. Wouldn't the very existence of such a vastly superior society—even without aggressive intent on their part—be a profound psychological shock to humanity?

C.S. I'm not so sure about that. The general kind of answer I'd give is that (a) the spaces between the stars are enormous, so it's not trivial for them to get here; (b) any civilization we're liable to make contact with is so *vastly* in advance of us that they could not possibly fear us yet; and (c) we're not likely to have anything that they need. I feel that the least of our problems is a direct negative consequence of receiving a message from another civilization. If we *do* make radio contact, I don't think we're going to be flooded with serious social disruptions. The existence of the message will be its most important property. We will know there is someone else out there. We will know that it is possible to survive our current period of dangerous technological adolescence—because someone else did. To understand the content of the message, to implement it, is going to be *very* slow, cautious work, taking decades or centuries.

Q. But there would have to be some kind of profound reaction.

C.S. It's going to be a novelty that people will adjust to quite rapidly—assuming of course, that we're talking about a signal that takes centuries to get from there to here. I don't think it will have any important negative effects. I *do* think it will have many important *positive* effects—in drawing for us a lesson on where we are in the cosmos, and in pointing out that there may be many beings elsewhere in the universe, but only *one place* where there are human beings . . . in stressing that the organisms on this planet are all—in the truest sense—brothers and sisters. I think our perception of *ourselves* is the principal positive consequence of contact.

Q. You've touched on the fact here that we're extremely limited by these huge gaps of time between the transmission and reception of signals. It's regarded as a kind of impassable barrier—the same sort of attitude that existed before the sound barrier was broken. Today's final, 'ultimate' barrier is the speed of light; theoretically nothing can exceed that velocity. If we can't account for some of the actions of pulsars, or understand all the characteristics of quasars, doesn't this indicate that speeds exceeding that of light itself may be possible?

C.S. No. I don't know of any observations of pulsars or quasars that challenge the precept of special relativity which says you can't travel faster than light. The sound

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barrier was never a barrier in the sense of the fundamentals of physics. It was always an *engineering* barrier. Some people thought it an insuperable engineering barrier, but it wasn't tied to the very fundamentals of physics. The idea of the velocity of light being a barrier is at the very heart of our present understanding of physics. There is a range of very strange phenomena which are repeatedly verified quantitatively—things like time dilation of very rapidly moving mesons (subatomic particles). The faster they go the slower they decay . . . the slower their little internal clocks tick. The mass of an elementary particle *increases* as it goes faster and faster, closer to the speed of light. This is why synchrotrons work.

Q. Does our current understanding presume that the theory of special relativity *can't* be wrong?

C.S. The job of the physicist is to understand the way the world is put together—to make a theory which explains all the bizarre phenomena. It is one of Einstein's great achievements—not only that he was able to *explain* these things but to predict them quantitatively before they were observed, a much more difficult feat. And he did it by making some *assumptions.* One of the *fundamental* assumptions was that no material object can travel faster than the speed of light. It's an *assumption,* and being only an assumption, nothing says it can't be wrong. But that assumption permits us to understand a range of phenomena in the real world, which otherwise no one can understand at all.

Q. How do you know that tomorrow some bright fellow won't come up with a theory which will quantitatively explain all these phenomena?

C.S. I don't know that there's no smart fellow who won't come along tomorrow and make such a theory. But until he *does,* I'm stuck with special relativity, which is one of the most productive and brilliant intellectual achievements of man.

Q. In what respect?

C.S. In that it permits us to understand *very* strange phenomena in a very simple way, and that it's derived from a deep and simple analysis of concepts of space, time and simultaneity. It's in *that* sense that the physicist says he thinks it's true, but *only* in that sense. Because I see that I can understand many mysterious things if I believe that you *can't* travel faster than light, I believe you can't travel faster than light. But I'm quite prepared to change my mind tomorrow—if somebody comes up with a better theory. But it's NOT tomorrow. It's today. I consider special relativity very strongly supported—as strong as anything else in physics.

Q. You just spoke of time dilation. What is it, and what are its consequences?

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C.S. Time dilation is another consequence of special relativity which partially helps to undo the sting of not being able to travel faster than light—travel close enough to the speed of light and your local clock CAN go as slow as you want. You can get from here to anywhere else in any time you choose, provided you can go close enough to the speed of light.

Q. I don't understand that. Even so, the galaxy is about one hundred thousand light-years across, therefore even traveling at exactly the speed of light, it seems to me it would take one hundred thousand years to travel from one end of the galaxy to the other.

C.S. Not at all. That's only as measured on the launch planet—or the planet to be visited. But as measured on the *spacecraft*, you could travel from here to the other side of the galaxy in—whatever you like—a year? It can easily be done. You tell me how long you want to take to get from here to some other place in the universe, and I'll tell you how fast you have to go—how *close* to the speed of light. You'll never pass the speed of light, you won't break any laws of special relativity, and still you can go *anywhere* in as short a period of time as you like. It's just an *engineering* problem to get that close to the speed of light. It might be .99999 the speed of light, and of course there are *huge* engineering problems to ever build a spacecraft

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which can go that fast. But in terms of the principles of physics you can go from any point A to any point B in however short a period of time you like.

Q. Alright. How do you manage to keep up with an active membership in so many organizations and still find time for your other interests—ping pong, stamp collecting, scuba diving and such?

C.S. There's something about the self-contained aspect of scuba diving that I like very much. I swim down with my camera and chase indigenous life forms—without hurting anybody. There's the sense of another biology down there, which is probably connected with my interest in finding life elsewhere in the universe. You also get a sense of three dimensions. We're very *two*-dimensional beasts walking along the surface of the Earth. In snorkeling, you know, it's very, very exciting to have twenty or thirty feet vertically within your command. With scuba gear you have a hundred or two hundred feet vertically. I'm sure that people who like skiing or gliding or sky diving do it for very much the same reasons—the thrill of that third dimension. But, I like to do it where there are other life forms around.

Q. At a meeting of the Committee on Space Research of the International Council of Scientific Unions, did any political or ideological barriers arise during the exchanges of ideas?

C.S. Sure, but I'd say almost equally on both sides. But what impresses me the most is how very similar and human scientists of various nations are. The advantages of free scientific communication are enormous.

Q. How does politics intrude?

C.S. For example, in the past, the Soviet Union would land an unmanned vehicle on Venus, say, or Mars. It sends along an embossed metal reproduction of the great seal of the Union of Soviet Socialist Republics. The United States sends some guys to the Moon and they plant a plastic American flag or a plate signed by Richard Nixon. Those seem to be precisely parallel activities. Scientists from both countries can deplore the intrusion of nationalism on what ought to be an international activity. It ought to be humankind that's sending unmanned spacecraft to Venus and Mars, and men to the Moon.

Q. Isn't that in fact what's actually happening?

C.S. In the longest perspective it is. But it would be nice to see the immense historical importance of planetary exploration acknowledged specifically. It also gives a perspective on earth-bound sciences, which is of enormous practical value. A better understanding of these matters might increase support for space science and explora-

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tion. In America today we are simply not utilizing our remarkable capability for space flight.

Q. Let's discuss UFOs; you throw out a list of alternative explanations for them—"Why the hell don't you consider this or that?"—One of the things you cited as a perfectly feasible consideration (if you're going to consider *all* the alternatives) was a *Time Machine!*

C.S. I wouldn't say perfectly feasible, I would say 'not obviously less feasible.'

Q. Alright . . . however remote time travel may be, has anything been learned recently about the properties of time to indicate that time travel can be a natural function of the universe?

C.S. No, I don't know of any new developments, along these lines.

Q. There's a paper put out by the Commerce Department called, I think, "Possibility of Experimental Study of the Properties of Time." (Ed. notes: JPRS; 45238 Published by the National Technical Information Service, Springfield, Va. 22151—$3.00) It said there were particles that supposedly move backward in time.

C.S. An old idea.

Q. Theoretical or mathematical?

C.S. Both. A particle moving forward in time is in some sense the same as its *anti*-particle moving *backwards* in time. Richard Feynman proposed this idea about thirty years ago. Like much of the world of elementary particle physics, it has some very surrealistic aspects. It also doesn't seem to have any practical consequences, but it's an interesting idea—another way of looking at the world.

Q. So you don't visualize anybody building time machines in the near future?

C.S. No, certainly no . . . at least not anybody I know.

Q. It's been said that Edmund Halley has the most stupendous monument of any human since the dawn of history—the comet named after him when he predicted its return. Yet you were responsible for something that will probably outlast Halley's comet and everything else ever built on Earth.

C.S. Halley was a terrific fellow. The Pioneer 10 plaque has a lifetime in the depths of interstellar space of at least hundreds of millions of years. It'll be around when a lot of other things on the Earth, like the Rocky Mountains, won't be. That's because the rates of erosion in interstellar space are much slower than the rates of erosion on the surface of the Earth.

Q. The United States won't have a Mars soft-landing until the Viking mission. What did *we* learn from the Soviet Mars-3 probe before they requested a moratorium on the news released from the data they provided? They had a hot line, and the story was that NASA could not release certain information.

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C.S. They wanted to release their communiqués, and we were free to release ours. They didn't want to have us release their communiqués. The Mars 2,3,4 and 6 entry probes all failed, so there was very little information from them.

Q. Their entry probes failed? I understand Mars 3 was transmitting for twenty seconds.

C.S. Mars 3, twenty seconds of *blank* television picture.

Q. Was it blank?

C.S. Absolutely featureless. You see, we know that at the place and time at which the spacecraft landed there were global dust storms, fierce winds . . . it was not a good place to go down. The idea that Mars 3 failed in those high winds . . . the idea that their twenty-second television transmission was clouded out, is a perfectly plausible explanation.

Q. In the study of the red shift from the light spectra of galaxies speeding away from us, it is possible that–*relatively*–a galaxy can be moving away from us and we from it, both at *more* than half the speed of light. Can the speed at which we're flying apart *overcome* the ability of light from each galaxy to reach the other?

C.S. What you're talking about is called the Law of Velocity Addition in special relativity.

Q. Well, I can certainly get around this limit on the speed of light. Suppose we have two spaceships leaving in opposite directions from the same spot. Both are going at .6 the speed of light, then relative to each other, aren't they going at 1.2 the speed of light, and therefore going faster than light?

C.S. The answer to that is 'NO.'

Q. Why not?

C.S. Because that's not the way the universe works. You don't just add up the velocites. There's a *new* law when you're traveling close to the speed of light, and it's a slightly more complex equation. That complex equation *never* lets you have a relative velocity greater than the speed of light, even though the two components may be traveling as close to the speed of light as you want. Even if both are traveling at .99 the speed of light going away from each other, their relative velocity, while it's greater than .99 the speed of light, is *never* greater than 1.0 the speed of light–*you can never exceed the speed of light.*

Q. Catch 22: it sounds as if it borders on the mystical.

C.S. That's only because you're not in the habit of traveling at the speed of light–or close to it. It's because you're used to traveling at, say, ten miles an hour, so you sample the universe in that velocity range. If you were sampling the universe at a velocity range close to the speed of light, then what I've just said would be quite plausible to you. We must be careful not to assume that our limited personal experience applies to very different

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physical circumstances.

Q. It's still Catch 22. Doesn't it sound absurd that your clock runs slower if you run down the hill rather than stand still?

C.S. That's surely not in your experience because the effect is too small to measure at ten miles an hour, and yet it's true.

Q. Measurably true?

C.S. Yes, measurably true. But of course the faster you go, the easier it is to measure.

Q. Has this actually been done?

C.S. Physicists do it all the time. Rapidly moving clocks slow down by the *precise amount* that special relativity predicts. The difference between being right qualitatively and being right quantitatively is quite an impressive difference.

Q. These measurements must be extraordinarily small.

C.S. But very accurately done. You see, you can't slip out of this one by saying, 'well, it's hard to measure something that carefully.' It's been measured to much finer precision than is necessary to show that it's true. And the fact that you can find mu mesons at sea level, well . . .

Q. What are 'mu mesons?'

C.S. They're subatomic particles produced by the interaction of primary cosmic rays at the top of the atmosphere, and take a certain amount of time to get to sea level. *Without* special relativity the time it would take for them to get to sea level would be longer than the time it would take for them to decay into their daughter products. But *because* of special relativity, because their velocity is so close to the speed of light, their 'clocks' slow down. Muons "think" it took less time to make it from the top of the atmosphere to sea level, than do observers not traveling close to the speed of light.

Q. Is the theory of special relativity applicable to widely differing life forms? Take for instance the average age of one man compared to the age of all mankind to a geologic or cosmic epoch? Doesn't a microbe with a life span that's measured in days or hours subjectively experience the same (subjective) longevity of a human being?

C.S. I don't think there's any connection. All those organisms are traveling at the same speed. No one is traveling close to the speed of light. For any of the effects I've been talking about to work you have to travel close to the speed of light. The answer has to be 'no.' If mosquitoes always traveled close to the speed of light, then what you suggest might be the case, but they can't, at least none of the mosquitoes I know.

Q. Well, this has been enormously interesting, stimulating and enlightening. We've covered a great deal of territory—I certainly appreciate the time you've given us.

C.S. I've enjoyed talking to you. ■

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PROBABILITY ZERO

HAYFORD PEIRCE

This is a department that was started in the April 1942 issue of Astounding Science Fiction and thrived for several years in the Forties. The best way to describe it is to quote John W. Campbell Jr.'s original description of the idea:

" 'Probability Zero' (is) a wide-open contest for all and sundry liars. Science fiction stories consist of guesses as to what probably will happen; a science fiction tall story consists of something that sounds practically logical, but that—well, lives up to the department title (i.e., Probability Zero). It not only isn't probable; it isn't merely improbable. It downright couldn't happen. Like that yarn about the grandfather clock that was so old the shadow of the pendulum had worn a hole in the back. You see what I mean? It's almost logical sounding."

Probability Zero will not be a regular feature of Analog. Only when some outstanding liar has a tall one to put over on you . . . as Hayford Peirce has here.

A small number of readers have had the temerity to call into question the likelihood of June's short story, "Side Effect," a sober attempt to consider some of the possible consequences of a magazine's all-out campaign to inveigle its readers into taking out lifetime subscriptions.

Not only is the conclusion ridiculous, chide these readers of small discernment, but also the very mathematical concept of the lifetime subscription.

Now it may well be that the Court of Appeals will find Mr. Gooding's sentencing to a lifetime proscription to be ridiculously draconic and will therefore throw the whole case out, but the mathematics of the proposition are beyond question. The subscription policy of *International Geography* is in fact, when compared to that of certain other magazines, of a blameless sobriety.

Consider, for example, the very magazine you are now holding.

Both on the masthead and on page four of this issue, the subscription rates are clearly marked. Check for yourself:

1 year: $ 9.00
2 years: $16.00
3 years: $21.00

The technologically and mathematically oriented readers of Analog will

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have sorted these figures out into their proper relationship almost as quickly as they will have read them:

1 year: $ 9.00 = $9.00 per year
2 years: $16.00 = $8.00 per year
3 years: $21.00 = $7.00 per year

In these troubled times of hideous and rampant inflation, I think that all fair-minded readers will heartily agree that these figures represent a bargain not to be missed. The astute, as distinguished from the merely fair-minded, reader will also have noticed that *the subscription cost per year becomes, for each added year, $1.00 less than the previous year's rate.* An observation of momentous consequence! For now only the simplest of extrapolations is needed to show conclusively that:

1 year @ $9.00 per year =
$9.00 for a 1-year subscription
2 years @ $8.00 per year =
$16.00 for a 2-year subscription
3 years @ $7.00 per year =
$21.00 for a 3-year subscription
4 years @ $6.00 per year =
$24.00 for a 4-year subscription
5 years @ $5.00 per year =
$25.00 for a 5-year subscription
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$21.00 for a 7-year subscription
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$16.00 for a 8-year subscription
9 years @ $1.00 per year =
$9.00 for a 9-year subscription
10 years @ $0.00 per year =
$0.00 for a 10-year subscription

The following conclusions may then be drawn:

1. It is impossible for any subscription to Analog for any period of time whatsoever to cost more than $25.00.

2. The subscription offices at Boulder, Colorado, will shortly be deluged with checks to the amount of No Dollars and 00/100, in payment of ten-year subscriptions.

3. It is indeed fortunate that our beloved Analog is indeed a magazine of science fiction and science fact and not, let us say, animal husbandry. For in what other field of publishing could a magazine have the breadth of imagination to survive, nay, to prevail, by giving itself away over a ten-year period?

"Astounding!" you cry.

Yes indeed.

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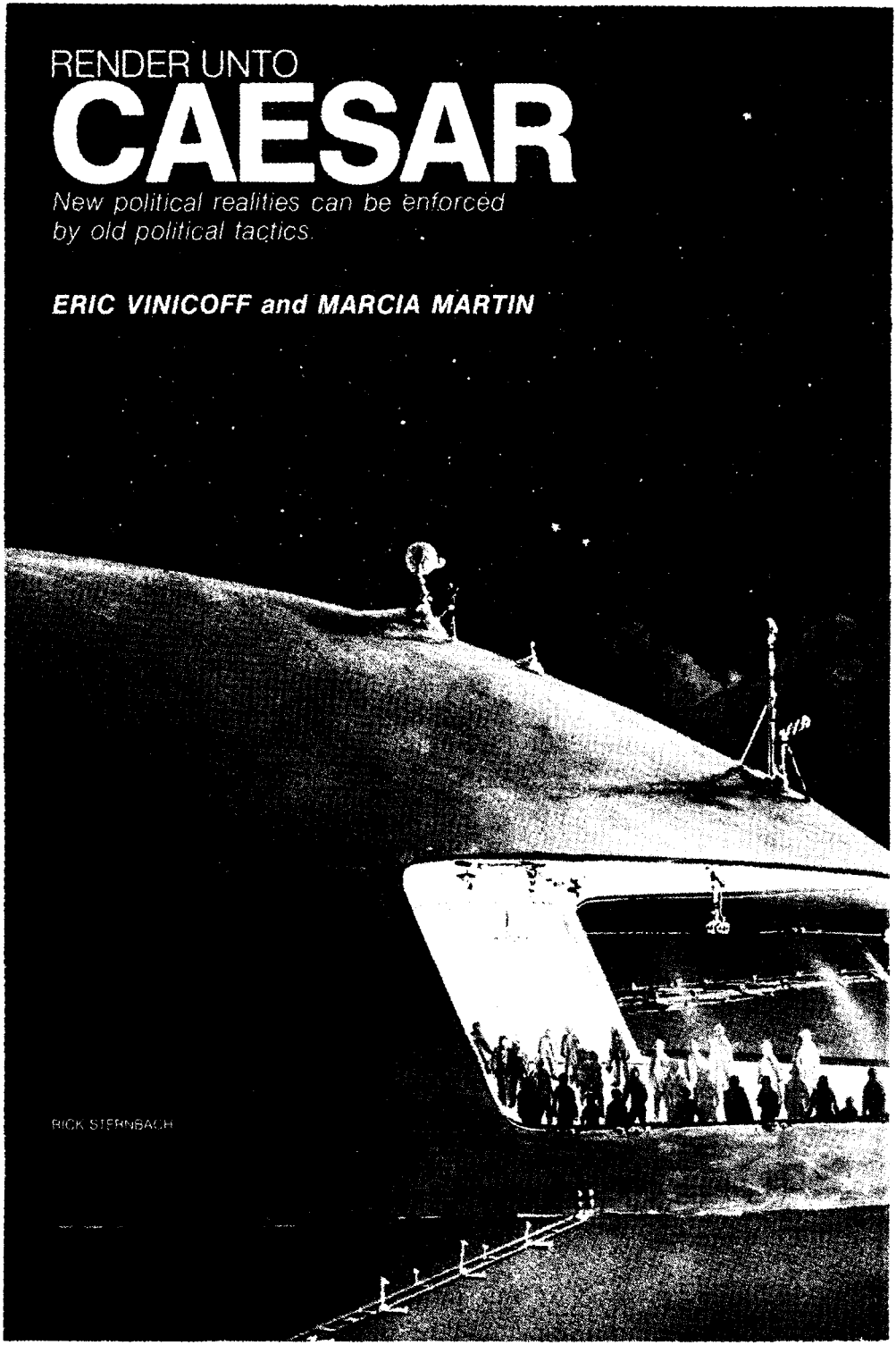
RENDER UNTO CAESAR

New political realities can be enforced by old political tactics.

ERIC VINICOFF and MARCIA MARTIN



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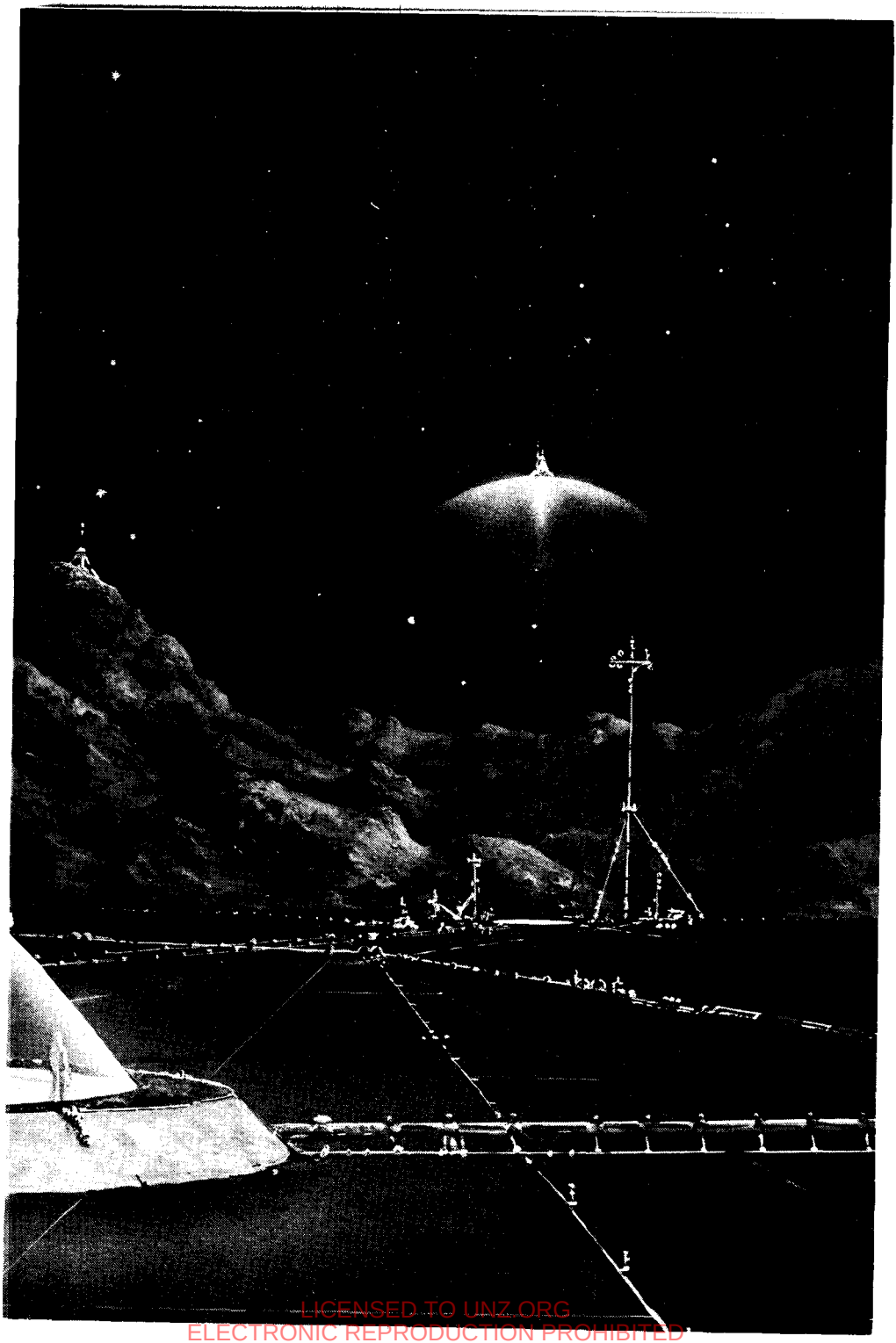

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(*INTER* TERRA *ET* MARS)

Pavel admired his would-be executioner.

The *kaesta* was a masterpiece of the surgeon-breeders' art; bulky, dark brown and at least three meters tall. It looked clumsy but didn't move that way. Pavel ducked beneath a slashing *Ursus horribilis* paw, losing two square decimeters of Aeroflot flight suit from his back, as well as some skin and blood. He moaned, rolled sideways on the hard alloy deck and sprang back to his feet. The narrow corridor left him little room for maneuvering.

Yes, he admired the *kaesta*. But he would have much rather admired it at a distance.

The *kaesta* came on again, an angry blur. Pavel swayed. He was weak, and getting weaker. While his right hand groped at the flap on his holster, he took a dodging step backward. His foot hit something slick—a smear of his own blood on the deck—and slid out from under him.

A mammoth paw, glistening with red, split the air where he had been standing.

The *kaesta* bent over him, growling. The surgeon-breeders hadn't given it human vocal cords to go with its human brain—unsurprisingly, since that would have added eighty thousand rubles to the cost. Ordinary guard *kaesta* didn't require such expensive frills.

Instead of striking to kill (which would have severely curtailed its victim's question-answering ability) the *kaesta* reached for the summoner on its chest.

Pavel finally freed the holster flap and drew his Walther XX.

The *kaesta* forgot instantly about the summoner—it pounced.

There was no time to aim; he pressed the firing stud.

The *kaesta* lashed out, knocking the stubby weapon from his hand, but not before a ruby-bright beam pricked its chest momentarily.

This time the roars of the *kaesta* were almost deafening. Pavel rolled backward, snap-extended and flipped to his feet. The effort left him semiconscious. Galaxies gyrated across his vision.

But it was all over. The *kaesta* collapsed slowly onto the red-dappled corridor deck, twitching slightly and coughing blood.

Pavel stood up, then sagged against the corridor wall. He knew that the engineering deck was isolated and crewless—his plan counted on it—but even so he was amazed that the sound of the fight hadn't attracted any attention.

For long minutes all he could do was lean against the white plastic, gasping. His medical implant whispered, "You need hospital service" over and over into his right ear, but he already knew that.

Drugs were being pumped directly into his bloodstream by the implant, and his mind began to clear—slowly. Perhaps too slowly.

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So much for my career, he thought. *So much for half of my life. Pavel Machotka: Aeroflot systems engineer and deep cover agent. Deep enough, apparently, to survive the security checks run on the crew for this flight. All my life in fact—I was training for this career before I dedicated my life to the cause.*

Staggering over to an access hatch set into the wall he touched his right palm to the ident-panel beside it. The hatch dilated open. He pulled himself into the tube thus revealed, and the hatch sealed behind him.

His strength was fading fast.

Marx, when will this state wither away? he thought fiercely. *And how? Surely not by the greed of those in power.* The tube was red-lit, packed with cables and electrical equipment, and a tight fit. He snaked along until he came to a junction box marked EXT. COM. CON. Drawing the Walther XX again, he burned the box into slag metal.

So we, the few who still hold to your dream, do what we must.

Behind him he could see the slick trail that he was leaving, black under the red light. Numbness was setting in, and his muscles weren't responding the way they should. But he dragged himself further along the tube.

And must we do even this; betray those who are after all our comrades—whatever their crimes—to the enemies of the proletariat? With a final desperate heave he reached a piece of equipment marked RE-CIRCULATOR FILTER FLUID INPUT. He opened a valve, and dark brownish-red liquid ran out. It stained his silver flight suit, but he didn't care.

Yes, we must. We need the proceeds of our Faustian bargain, and, while our fellow travelers are far away, the need for a true Marxist state is immediate.

From a pocket he took a small plastic flask. Taking a deep breath, he opened the flask, poured its clear fluid contents into another valve atop the piece of equipment, touched several heat-switches and backed away before gasping a slight breath. After throwing the flask far ahead of him, he resumed his frantic retreat.

But flesh and muscle had their limits, and he knew that he had reached them. With vivid regrets for so many things undone, he shut his eyes and died.

(HABITAT, MERCURY)

"Meanwhile at Rome people plunged into slavery—consuls, senators and knights. The higher a man's rank, the more eager his hypocrisy, and his looks the more carefully watched . . ."

The excerpt from Tacitus' *Character of Augustan Rule* came uninvited into Anthony Vale's mind as he looked at himself in his lavatory alcove mirror. It neatly summarized the men against whom he would

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soon be set, the "lean and hungry" wolves from Earth. Lesser wolves, granted, envoys of the modern *Imperatores* who were devouring a planet, but fearful predators nonetheless.

It also reminded him of how twenty centuries hadn't changed human nature. *Since history endures in that case,* he mused silently, *perhaps it'll do likewise today. Dear Mother Mary, I pray so.*

The Mercury Consortium Board member stared at a reflection of his ordeal. It was scribed in the eyes bloodshot from lack of sleep, the deepening lines above his thick Mediterranean brows, and the paleness that had replaced his usual ruddy color. The face staring back at him was perfectly suited to the tired executive who lived behind it.

Crossing his apartment to the muted violet bed-field, he picked up his battered attaché case from the reading table. The door opened at his approach, and he stepped out into the vestibule. Here his VIP rating served him. Instead of sharing a corridor loadramp with dozens of other dwelling units, he had a tastefully elegant personal one, as well as a door opening on his level's walkway. He was in a hurry, so he summoned a single-seat tubecar.

The small cabin and molded plastic chair were, as always, too cramped for his 191 centimeters. He irritatedly punched out a destination code on the keyboard, then settled back as the tubecar accelerated. Like any good stockholder-citizen, he hated the Tube Transport System. He hated the discomfort, the rush-hour delays, and above all the feeling of being a *parcel.* He knew that TTS was the best form of mass transit for Habitat's unusual needs—but that didn't mean he had to enjoy riding it.

The only sound within the cabin was a soft buzz that he had long ago learned to tune out. *Is all of this really worth the price we paid for it?* he wondered, as he had wondered increasingly in the past few weeks. *Not just the money, but the effort, the things left behind—and the lives? Is it really worth fighting for? We could always give in.*

As always, there came an answer: *We couldn't live the way we wanted to on Earth, so we came here. We haven't much, but we do have a society that satisfies us—and that's worth defending if anything is. So Jules argues, and the stockholder-citizens echoed him at the preliminary polling. But will they do so again when it's time to cross the Rubicon?*

And what about me, the miracle man who claims to be able to pluck victory out of a hopeless situation? Can I? And, knowing the price, should I? If my plan goes wrong, it'll go very wrong indeed. Fatally wrong for nine hundred thousand stockholder-citizens.

Knowledge of the stakes with which he was gambling began to

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unsettle his stomach. His Mercury Consortium Board seat had been won by conquests in the area of high finance. Dealing in megafrancs he found exciting; dealing in human lives terrified him.

He lacked the confidence of a diplomat, not to mention the training. His opponents, on the other hand, represented the four greatest powers in the history of humanity: Pan America, People's China, Noreuropa and the USSR. To counter them he was depending on his own practical political experience and the tactics of an empire fifteen hundred years dead.

He floated forward slightly as the tubecar decelerated. The hatch opened, and he stepped out into the bustle of Administration Central's foyer. The large circular area was aflood with humanity; all gliding in the dainty gait caused by the four-tenths-of-normal gravity. There were workers boarding the tubebuses that ran out to the local mines and refineries, tourists, spacemen in their flight suits, white collar types and so on. He pushed through the crowd to reach the Window.

The thick triple-insulated pane dominated an entire sixty degrees of the wall, and it was one of the only two Windows in Habitat—Jules Nakai had the other in his office. Dozens of people milled in front of it. Anthony Vale pushed through to a good viewing position. For some reason, no matter how rushed he was, he always had to stop for a look.

It was night outside, of course; alloy reflectors covered both Windows during daylight. But the Tourist Department had illuminated the view with floodlights. He stared out at a pie-slice of the glossy white Shield that covered Mercury's surface for three kilometers in every direction. Habitat lay beneath it, a vast cylinder sunk into the planetary crust. Only the Administration Central dome sat on top.

Over two kilometers from the Window, just within the edge of the Shield, a small circle radiated internal white light. The sun was down, so the spaceport was open for business. Even as he watched, a fat cargo flitter dropped out of the star-strewn sky into the hole, fetching ore and personnel from an outlying mine. He was faintly disappointed; he had hoped to see one of the mammoth space freighters lift off.

Vanadium, cobalt, nickel, copper, molybdenum, silver, platinum and the atomic power metals; our lifeblood. Earth's, rather, and we survive by feeding its resource hunger. A safe enough thing when we were small and struggling, but Mercury has proved to be a treasure trove.

And the Mercury Consortium is now a pie to be divided among those with enough power to seize a piece. Unless I can stop them.

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Beyond the Shield lay dark, undetailed terrain. But he had seen the harsh mountains, craters and cracked plains many times during daylight expeditions—and he hated them.

Alien. So damned alien, this world we now call home. It gives us the materials we need to make our air, water, food and so on—not to mention what we sell to Earth. But who could love it?

Habitat, though, isn't Mercury. Here, underground and isolated, we've built our Utopia, the best of Earth that we could bring with us. Habitat we can love. We do. The Earthophiles and claustrophobes are all long gone, and the Mercury-born don't miss what they've never known.

Suddenly two arms grabbed him from behind and pulled him away from the Window. "Wait your—" he began, spinning around. Then he stopped. The puller was Mary Sunshine, his secretary. Her stocky Eskimo features were augmented by a flame orange jumpsuit and a green beret pinned to her hairdo. She tilted her full-moon face up to look at his.

"Gotta chop it, bosman!" she said briskly. "A reactbird tailed at two twenty dex. Nakai wants a chi-chat, prontoest, and—"

He had no time or desire to decypher teener slang, so he gently placed a hand over her mouth and said, "Speak Italian, please. What ship landed, and where is Jules waiting for me?" Then he removed his hand.

"A UN Patrol cruiser set down ten minutes ago!" She was trembling from the importance of her news. "The VIP ground pigs are being deloused at Arrivals right now! How they must be hating *that!*"

As she spoke he pulled her through the crowd toward the loadramps.

"Anyhow, the mega-bosman . . . Mr. Nakai is in Conference A. He wants a prep talk with you before the main huddle forms. Arrivals has been given the word to hold the dung-dippers for ten more minutes."

"Then we had better hurry." They stopped in front of an in-Central loadramp. He placed his palm against the ident-panel and touched the priority button. Seconds later the door hissed open.

"Has Captain Madlock broken com-silence yet?" he asked as they entered the two-seat tubecar. They sat down, the door shut, he tapped out a destination code, and the tubecar descended.

"No sight, sound or signal. That free-floater is strictly non-sched."

He winced at the truth of her words. Only Jules Nakai and he knew that the Mercury Consortium's survival depended partly on Captain Madlock.

The knowledge gave him no pleasure.

"If and when he larks in," she

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said, "I'll data-feed you prontoest."

(*INTER* TERRA *ET* MARS)

Aeroflot's *Lenin* was midway in its flight to the planet of the War God, bearing the most precious cargo in its long and illustrious history. Only four men and women were tending the control deck stations; the system engineer was below on an errand.

Captain Resnick pushed a stray blonde hair back under her safety cap. She appreciated the honor, but it frightened her. If anything went wrong. . . . And space travel was by no means routinely safe yet. She knew of the security checks for her and her crew, the defense screens and beam projectors mounted on her normally peaceful vessel for this one mission, and the squad of *kaesti* guards below, but she thought of them as mere UN paranoid overreaction. The real dangers were the traps that the universe laid for invading humans.

It never occurred to her that there might be traps of human origin, nurtured in the very bowels of her ship.

"Tartov," she said to the astrogation officer, "set up for the hourly star-fix. Line up Polaris and—"

Suddenly a red light appeared on the life-support board. "Someone is tampering with the recirculation system!" Lieutenant Relenko reported.

"System shutdown—" Captain Resnick started to order, but the sentence died in her throat. She couldn't breathe. Something was constricting her lungs like a coiling anaconda. Her vision blurred.

Tartov and the other officers were likewise affected. "Gas!" Lieutenant Relenko gasped. Then he fell out of his chair.

Captain Resnick slapped the Mayday heat-switch on her lasercom board, but it glowed red. The signal wasn't going out.

Before she could quite understand what was happening, or figure out what to do next, she spun into blackness.

And at the perimeter of the long-range scope a blip appeared, moving toward the center.

(HABITAT, MERCURY)

Anthony Vale exited from the tubecar so quickly that Mary Sunshine had to scamper to keep up. Conference Room A's door opened at their approach. He sent her off about her own duties, then went in.

The room was larger than necessary, for psychological effect. Yellow fluorescent panels cast warm illumination on fake mahogany plastic. The round oak table had come from Earth; its six stations possessed every modern convenience. A padded chair faced each station.

Jules Nakai, Chairman of the Board of the Mercury Consortium, smiled up from one of the chairs. The frail-looking man was essentially an artist, a creator on an

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enormous scale. He had risen from bastardhood in post-WWII Japan to create first hydrogen plasma handling equipment, then a corporation (Tengana Electronics) to handle the handling equipment, then an alliance of corporations to exploit the Tengana-invented gravity differential space drive, and finally an entire society based on the sound business principles that he had lived by all of his life.

"The *Weltpolitik* poker game is about to begin." Jules Nakai's voice was calm. "Earth's cards are too well known. How does our hand look?"

Anthony Vale sat down next to the Chairman. "Nothing worth betting on—except we haven't any choice. The UN Patrol has two million Rangers and a fleet of thirty-six armed cruisers. They have A-bombs, H-bombs, IR lasers *et al.* We, on the other hand, have a three-hundred-person police force, eight unarmed frigate-class freighters and six unarmed passenger liners. If this degenerates into a military contest, we haven't a chance."

"So we can't let that happen," Jules Nakai said. "I'm no political scientist, as you well know. The only tool I can use to analyze this situation is game theory. But such analysis depends on rational gamesmanship by both sides. Will the power blocs follow our logic?"

Anthony Vale shook his head. "I just don't know for sure. I'll have to feel the envoys out carefully before beginning the negotiations."

"A crisis of faith?" Jules Nakai asked softly.

Anthony Vale felt a great hatred rising up through him, focusing on his old friend. Then it broke like a wave on a beach, and he sighed. "I guess so. It's all on my back, you know."

"No, it isn't," Jules Nakai said firmly. "The Board and I have approved your plan, and the stockholder-citizens will have the final say. So buck up." After a pause he added, "Did you take your environment therapy? I don't want the walls closing in on you during the session."

"Three hours of it last night." *Three hours in the image-room, with the visions of wide Earthly horizons, because the Earth-born never fully adjust to the enclosed environment.* "Don't worry, Jules—I'm in control. I'll do the best I can, and pray."

"Good. It's your plan, so you'll have to handle the negotiations."

"You'll be your usual humble self, I suppose?" Anthony Vale asked with a touch of sarcasm. He didn't want any elbow-jostling at the wrong time.

Jules Nakai chuckled confidently. "But of course. Haven't I always given you your head? Besides, since you've been so close with the details, what other choice do I have?"

(*INTER* TERRA *ET* MARS)

From the outside the small pas-

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senger liner looked old. On the inside it looked sloppy. But beneath the grime of the engineering deck lay new GD engines powerful enough to lift a fully-loaded freighter from Jupiter's surface.

The shabby vessel was nestled against the larger, newer *Lenin* like a tugboat moving a proud queen of the fleet.

Two young women and one young man labored on the control deck. Their captain strode from station to station, checking everything. He was an ancient man with shoulder-length white hair and a red face. His flight suit had been obsolete for thirty years.

Pausing behind the com officer he demanded, "Status report!"

"They didn't get a call off, skipper!" Lieutenant Yinger's voice quavered. Like everyone else on board, she was afraid of Captain Madlock. "The timer on their fusion pit is set for thirty minutes; plenty of time to get clear."

Captain Madlock stomped over to the scan board. "Any company?"

Lieutenant Law shook her head. "Not a sign, skipper!" Then she smiled tentatively. "It seems we're home free."

"Who asked for your bloody opinion?!" Captain Madlock roared. "You just keep your eyes on them damned scopes! I don't want no dung-dipper scows slippin' up on us!"

"Aye aye, skipper!" Lieutenant Law's turn back to her scopes was nothing more than a blur.

Jim Madlock Jr., the Purser, entered. "Wipe the doom gloom off your phiz, pater. I told you outwitting the Terries would be no prob."

Captain Madlock bore down on his son like an angry bull. "Lock a baffle on that thruster, boy, or I'll feed you to the plasma chamber! We ain't clear o' this till we get Mercuryport's Shield betwixt us and Earth! Now, dammit, gimme your status!"

"I've got the 'payload' stowed away." Jim Madlock Jr. was subdued. "The crew, too. Except our, ah, business associate. We found him dead of *kaesti* wounds in the Jeffries Tube. But he must have done his job before dying."

"Then get out o' here and seal it up!"

The young Purser gulped, nodded and left at a dead run.

Captain Madlock turned to Astrogator Shatz. "Plot a minimum-time flight program home! Stand by to execute! Don't just sit there slack-jawing me, you unlicked cub! I gave you an order! Move it!"

Captain Madlock's anger masked worry and suspicion. It was all going too smoothly; in space, emergencies were the norm.

What he didn't realize (and what Anthony Vale could have told him) was that the apparently easy and casual capture represented only the tip of a six-month iceberg of painstaking, dangerous effort. Smoothly

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was the only way it *could* have run; any missteps would have been fatal to the plan.

And, despite all of their preparation, a last-minute change in the *kaesti* patrol schedule had cost a man's life.

(HABITAT, MERCURY)

A violet light over the door glowed briefly. Anthony Vale and Jules Nakai ended their discussion and put on concealing official faces.

The four delegates were ushered in with no ceremony. Anthony Vale wasn't surprised to find that the "impartial United Nations envoys" were a Pan American, a Noreuropan, a Chinese and a Soviet. The power blocs were here to claim their prize.

Ti Ho Chi, a former Vice Chairman of the Central Committee of People's China, was well known to Anthony Vale by reputation as a bare-knuckles type—and looked it. The Pan American introduced himself as Senor Guzman, and apparently his stomach didn't approve of the low gravity. His over-manicured elegance gave him a foppish aura, but Anthony Vale wasn't fooled—no fops would be representing the power blocs on *this* mission. Comrade Ivanov was short, dumpy and visibly suspicious of everything around him—including his fellow delegates. Herr Einerson, the head of Noreuropan Military Intelligence, was by all accounts brilliant—and brilliantly ruthless. His emotions, if any, lay hidden behind impassive Nordic features.

The amenities proceeded shallowly to a swift conclusion. Both sides were eager to get on with the matter at issue.

"Here." Herr Einerson tossed a document in front of Anthony Vale. "Brief and to the point. The United Nations has finally resolved the question of jurisdiction *in re* Mercury. All national authorizations for extraterrestrial development have been superceded by a new United Nations Act. Your previous arrangement with the government of Japan is, therefore, null and void. Only the Security Council may now grant charters to exploit extraterrestrial resources. To be frank, yours is an illegal operation under the new Act. You shouldn't be here."

Anthony Vale smiled sweetly. "But we *are* here, Herr Einerson. How do you propose to remedy this irregularity?"

"The United Nations has designated Mercury a UN Protectorate Territory. A Government House and Patrol base will be built up here to administer UN policy and extend Earth's security sphere. You'll have to register with the proper Protectorate agency. Since you've already sampled Mercury's riches liberally, there will be prorated back taxes—"

"Taxes?" Anthony Vale had been scanning the UN document while he listened, but his head snapped

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up at that last word.

Comrade Ivanov took over. "By all means. You must pay for the privilege of mining UN-controlled territory, as well as for the benefits derived from UN jurisdiction. Income and land-use taxes, plus other fees described in the Act." His Esperanto was almost illegibly accented.

Anthony Vale could see their plan, a more subtle plan than he had expected. *Outright expropriation might be questioned Earthside as too baldly illegal. This is much better. Let us work our hearts out, then milk us through taxes of everything but our bare survival needs. And with a Patrol base next door, who would dare dispute the taxation? Mercury would be an open prison camp laboring for the power blocs.*

"I seem to recall that an American named Patrick Henry once spoke against absentee taxation," Jules Nakai observed, looking at Senor Guzman. "Will the Mercury Consortium receive a General Assembly seat?"

The Pan American envoy showed white shark's teeth. "Surely you jest. Yours is a commercial organization, not a nation."

Anthony Vale was concentrating on his station's data display screen. *What will it be, stockholder-citizens? On to Rome, or back to Gaul?*

The conference was being broadcast to every stockholder-citizen on Mercury. The question previously put to them was; do we accept the UN program or fight? Each person phoned his or her vote in to the computers at Com central, where it was voiceprint-verified and tabulated. When and if the two-thirds majority required by the Consortium charter developed, the *vox populi* would appear on Anthony Vale's screen.

Jules Nakai engaged the envoys in a delaying action, a question-and-answer session concerning the details of the Act. Finally, after nearly fifty minutes of stalling rhetoric, the screen flashed a single word that only Anthony Vale could see—fight.

"We reject your taxes, your Patrol base, your UN Act—and you." Anthony Vale was scared, so he spoke boldly. "The stockholder-citizens of Mercury won't be dictated to by Earth. We are, no matter what you may think, a sovereign state. We won't submit to slave status."

Ti Ho Chi exploded. "Reject us! Are you fool enough to think we care about your opinion?! With six shiploads of Rangers we can—"

Senor Guzman interrupted smoothly. "Let's not compound our troubles with hasty words. Surely an understanding can be reached without any, ah . . . pounding of chests." He showed Ti Ho Chi a pained expression.

"I say a demonstration of sincerity is in order!" the Chinese envoy roared. "Our cruiser mounts weap-

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ons! Re-education can begin at once!"

"You won't attack us." Anthony Vale put much more assurance into his words than he felt. "There's no profit in radioactive ruins. If you invade us, you'll meet total resistance and 'scorched earth'. We'll blow up every mine and refinery. So why kill the goose that lays such valuable eggs? I have a better idea; grant us sovereignty and let us join the UN."

Senor Guzman chuckled daintily. "Such matters aren't in our purview—we leave them to Patrol strategists. But I'm sure a suitable method of nondestructive persuasion can be found. There are many possibilities. Your ecology *is* artificial—and rather fragile. Perhaps a siege. . ."

"Try it," Jules Nakai broke in. "You'll be surprised. We're almost self-sufficient, and we can make it the rest of the way if we have to."

"Biological warfare then," Herr Einerson proposed. "Or the Swiss assassination technique. Or something else; there are—"

"Hey, bosman!" The bell-like tonalities of Mary Sunshine emerged from the com at Anthony Vale's station. "Your man just tailed in. He said to tell you the cargo is one hundred percent, and you should give the Terry dung-dippers—" Anthony Vale nearly strained a wrist as he slapped the com cutoff button.

He didn't wait for the envoys' outrage to fade. He had a lever, and he wanted to use it. Properly placed, it might pry Herr Einerson and his greedy associates away from Mercury for a long time.

"You gentlemen are guests on Mercury Consortium territory," he began, "yet you threaten us with invasion and conquest. Well, we don't care to hear any more of your arrogance. Listen to *our* terms, then go."

"Why, of all the—" Ti Ho Chi bellowed, but Anthony Vale cut him off.

"I implied earlier that you should leave Mercury alone because the alternative would be more expensive. Gentlemen, costs have just gone up."

Senor Guzman smiled. "Or so you would have us believe."

Anthony Vale smiled back. "We're businesspersons here—as you've seen, we think primarily in economic terms. I discovered the solution to our problem of defense, however, in Caesar's *Commentaries.*"

"And what would that be?" Comrade Ivanov demanded sarcastically. "Legions in rusted armor? Slave galleys?" He laughed, ending with an unmuffled belch.

"One tactic Caesar used to keep defeated tribes pacified was to take and hold hostages, usually children from the chieftain's family. They were raised in Rome by the Republic *not as prisoners but as citizens.* This shows the Roman genius

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for empire, since the good treatment kept tribal animosities to a minimum.

"I can see from your faces that you preread my point. Yes, we've taken hostages—one hundred children from the ruling families in your four countries. It was costly, but not very difficult. An Earthside political terrorist organization, highly skilled at such work, was most willing to help us for a price, and our own Captain Madlock brought them here."

"One hundred chil—the UNESCO System Tour!" Comrade Ivanov barked. "What kind of cruel, stupid joke is this?! The children were on their way to Mars as the first leg of an educational tour, but the *Lenin* accidentally blew up last night! They're all dead! DEAD!"

"That's how we arranged for it to look," Anthony Vale said, smiling. "Actually no one has died—yet."

"Impossible!" Ti Ho Chi bellowed. "You can't have kidnapped them! You're talking about the most thoroughly protected children on Earth!"

Anthony Vale shook his head. "Anyone, no matter how well guarded, can be kidnapped if there is enough ability, financing and determination behind the effort. The terrorists have had decades to develop their skills, so we hired the best. They supplied the ability, we supplied the financing, and our money supplied the determination."

Senor Guzman said softly, "I think, before this goes any further, we had better see the young ones—if you really have them."

That matched Anthony Vale's own intentions, so the four envoys were escorted to the Arrivals area. One hundred boys and girls between the ages of ten and fifteen were being processed in the large receiving room. Each of the UN envoys spoke briefly with several of them, and Jules Nakai supplied fingerprints and other identity proofs. Then, at the Board Chairman's suggestion, they returned to Conference Room A.

Anthony Vale was very glad to leave the sobbing, terrified children behind. His burden of guilt was heavy enough as it was.

"You'll turn them over to us immediately," Ti Ho Chi growled when everyone was again seated, "or the entire might of the United Nations will be mobilized to destroy you!"

"I think not," Anthony Vale replied calmly. "Any military action would endanger the lives of the hostages. We might not be cruel enough to execute them, but it would be a simple thing to put them in the forefront of any fighting."

"We don't negotiate with kidnappers!" Comrade Ivanov barked. "Nor do we pay ransom! You can't accomplish anything by this outrage!"

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Anthony Vale nodded. "I know the official policy. It's fine when the kidnap victim is someone else's loved one. But the leaders of your countries are also fathers and mothers. We're betting everything that they won't risk their children's lives for the money they could squeeze out of us—or for vengeance either."

Ti Ho Chi and Comrade Ivanov tried to launch fierce replies, but Senor Guzman stopped them with a gesture. He said to Herr Einerson, "You're an expert on such matters, Gunnar. What is your opinion?"

Herr Einerson frowned for a long time, then answered, "My Premier is the hardest, coldest, most pragmatic man I've ever known. But he loves his daughter Inga, whom I was just talking to, more dearly than his own life. I don't think he'll risk her to gain Mercury." He shook his head.

Senor Guzman turned back to Anthony Vale. "Let's grant for the moment that what you say is true. What ransom do you wish?"

"No ransom, just what is rightfully ours; sovereignty, full territorial integrity and a seat in the United Nations."

"Have the seat!" bellowed Ti Ho Chi. "Have it and rot in it! All we ask is that you release the children! You're civilized men; how could you plan and carry out such a cruel act? Using children as pawns!"

IN TIMES TO COME It's not true that no one does anything about the weather. Since 1946, researchers and scientific "rainmakers" have been seeding clouds to squeeze extra precipitation from storm systems, to prevent damaging hail falls, and even reduce the frequency of lightning strokes in an effort to cut down on lightning-triggered forest fires. Next month, William E. Cochrane takes current technology to its next logical developmental level, both technologically and politically, in a fast-paced adventure called "Weather War." The basic problem of the story is simple: What do you do when you're trapped on a lonely Pacific Island (where you have been triggering man-made tornadoes) and a mammoth hurricane suddenly bores down on you? Kelly Freas has done fine symbolic cover painting.

Also in our September issue, "Aspic's Mystery," by Arsen Darnay, a writer who's new to Analog. We'll have several additional stories and a surprise or two besides.

The science fact article in September's issue will be "Enriching Isotopes with Lasers," by Jeff Hecht. Turns out that the unique properties of monochromatic laser light can be used to separate uranium-235 from its less-fissionable but more abundant U-238 cousin. This could make the nuclear power industry—and bomb-making—much cheaper.

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Anthony Vale was suffering acutely from that very guilt, but he couldn't let on. "You've left us no choice. We have to defend ourselves any way we can. As for the hostages—they'll never leave Mercury. They're our protection, our only line of defense."

"You wouldn't need any defense," Herr Einerson pointed out sharply, "if you hadn't demanded such high prices for your resources. You've plunged Earth into an economic crisis. Inflation, recession, a balance of payments disaster; you know that our technology, our very society would collapse without your resources, and charge accordingly. We had no choice but to take direct action."

"You had every choice!" Anthony Vale was angry. "You could have negotiated! Of course our prices are high; building a new world is expensive! But we could have worked something out! Instead you took the thief's way!"

Ti Ho Chi made a convulsive lunge at Anthony Vale, but Herr Einerson grabbed him and held him back. Concealed slits in the wall opened to reveal alert police gunners with laser rifles. The emitter bells tracked the Chinese envoy, who subsided.

"An incident would be very embarrassing at this time," Jules Nakai said softly.

"You may have outwitted yourselves," Herr Einerson observed. "Our leaders might stop all actions against you to save their children—if they can. But these brazen kidnappings can't go unanswered. If they do, the power of our leaders will be undermined by their apparent impotence. Others, unaffected by your blackmail, will take their place. Then you'll be in an even worse position."

Anthony Vale smiled. "Who knows of any kidnappings? The children and the crew of the *Lenin*, yes, but they're going to stay here. We won't let any news leak Earthside. That leaves you gentlemen, and your leaders when you tell them. They'll cover-up to protect their children—and their political positions. You'll cover-up because they'll order you to."

"Perhaps we cannot attack you," Senor Guzman said, "but there are indirect pressures we can bring to bear."

"Anything that hurts us hurts the hostages," Anthony Vale replied flatly.

"Doesn't it bother you that what you're doing is immoral?" Herr Einerson asked. "You're going to torture a hundred families by keeping their children from them. And what of the children themselves? They're innocents; how can you justify what you're doing to them?"

"We aren't evil people," Jules Nakai put in. "We'll raise the children in foster homes where they'll be loved. All of the hostages will be given full stockholder-citizen rights and comforts, minus only the

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right to leave Mercury. Two more things—as soon as we get our UN membership we'll arrange it so the families can come up here to visit their children, and we'll also negotiate lower resource prices. Unlike you, we're not greedy. An economic collapse Earthside would ruin us too."

"That's all well and good," Herr Einerson countered, "but visitation privileges and lower resource prices won't redress kidnappings."

"We only did what we had to do to save our homeland!" Jules Nakai inserted hotly. "And no more than necessary! Certainly there's immorality in kidnapping young children—immorality that we've done everything we possibly can to recompense both the families and the children for—but what about the immorality of enslaving a nation of nine hundred thousand?!"

"We're enslaving no one," Senor Guzman said suavely.

"Spare me your sophistries!" Jules Nakai flamed up again. "Your 'Act' amounts to slavery whatever you call it! We have a good life here; a much higher standard of living than any Earthside nation, fewer social ills, no population pressure! Our corporate state works! We have a right to defend our nation from invasion! Would you rather have the bloody immorality of war?! Its cruel, but sometimes a lesser immoral act is necessary to prevent a greater one!"

"Perhaps so," Herr Einerson said softly. "But, if so, I have a suggestion which may partially remedy and set right the wrongs done to the children and their families—families made up of not only the leaders you seek to blackmail, but also bereaved mothers, sisters and brothers."

"What?" Jules Nakai asked suspiciously.

"Let the families come here to live with their children."

"What?!" Jules Nakai couldn't believe his ears, but Anthony Vale's mind raced ahead, analyzing the startling proposal from every angle. *Dear Mother Mary, why didn't I think of that!* A great part—but not all—of his guilt left him.

"You must be joking!" Jules Nakai protested. "Why . . . the leaders wouldn't quit their positions and—"

"Not the leaders; just their families. You see, most families of major politicians are used to living separately from said politicians for long spells; it's a common practice to keep loved ones out of the capital cities and their much greater dangers, especially that of assassination. Why, my own family lives in the country hundreds of miles from my department in Heidelberg. And these families are also used to moving from place to place; they would adjust to your excellent lifestyle here quite well."

"And the children would be with their parents!" Anthony Vale said

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eagerly. "Yes, I like it."

"But . . . why would they come?" Jules Nakai was still floundering.

"To be with their children, of course," Herr Einerson replied. "We'll need a cover story to keep the kidnappings secret; a goodwill gesture to welcome the Mercury Consortium into the community of nations or something like that. A minor detail."

"We would treat them as befits their importance, of course," Jules Nakai said bemusedly. "Their presence would make us even more secure. But why do *you* want to enhance our number of hostages, Herr Einerson?"

The Noreuropan shook his head. "I'm only acting in the interest of my superiors—and their families—all of whom will want to be with their kidnapped children. Since the Terra-Mercury flight requires only slightly more than a day, all of the leaders will be able to see their families often."

Jules Nakai was silent for long moments, then said, "Very well. The families will be welcome and well treated—after we receive our guarantees and UN seat."

There was another lengthy silence. The envoys looked at each other. Herr Einerson turned to Anthony Vale. "Several months ago I had occasion to say that warfare by assassination is the ultimate form of human conflict, invulnerable and all-conquering. I stand corrected."

Senor Guzman rose, signalling the other envoys to do likewise, which they did. He showed Anthony Vale a thin smile. "We shall carry your words to our superiors. Naturally the final decision is theirs. However," his face went impassive, "I fear that your voice is destined to become painfully familiar in our General Assembly meetings. Adios."

The Earthside delegation departed with a police squad "escorting" them to their cruiser.

Anthony Vale almost collapsed in his chair from the terrific release of tension. *We did it! We won—for now.*

Jules Nakai was staring questioningly at him.

"Cheer up," Anthony Vale said weakly. "We just heard the verdicts of two career power-brokers."

"I know. I just have trouble accepting it. After all this time the battle is over."

Anthony Vale raised his head and stared at his friend. "The hell it is! We've just begun to fight! The Terries are going to try every sneaky trick short of open violence

error of omission

In our questionnaire on the Time-Twin Study in the June issue, we inadvertently left out a vital line. It is imperative to have information on the *exact time, place and date* of the child's birth. If you are planning to respond to our Crucial Experiment II, please add this information to your response. If you have responded, send us a postcard with the data.

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to get the children back. We'll have to be on our guard every second. But at least it's a kind of fight we *can* win, unlike open war."

"I see." Jules Nakai smiled.

"You do, do you! Do you also see that this victory is temporary? In ten years our ransom victims will probably be losing control of their countries, and the new leaders will surely be just as greedy. The hostages won't be adorable children anymore, either. Then what? They certainly won't let us get away with *this* again."

Jules Nakai kept on smiling. "Then we'll do something else. Maybe we'll build a military defense structure—we can afford it. Or maybe we'll forge protective alliances with other nations. Or maybe some other tactic. We're buying time, and that's what we desperately need. And, of course, when we've made those other arrangements we can let all of the hostages go home." He paused, then backtracked. "At least I pray we're buying time."

Anthony Vale made the sign of the cross over his chest. "We could certainly use His help, but I doubt that He smiles on kidnappers . . . Even with all of our steps to redress the kidnappings I can't help feeling guilty over what we've done to those poor innocent children." *The guilt-pain will stay with me for life, punishing me.*

"Then," Jules Nakai countered, "let *me* remind *you* of your Roman history for a change. The hostages from Gaul grew up contented and loyal to Rome. They became, in all ways, Roman *civitates.* If Caesar can do it, so can we. After all, we have quite a world to offer them."

"We shall see," Anthony Vale said tiredly. "The ultimate answer to all questions . . . we shall see."

UPI TICKER (NEW YORK)

. . . SECRETARY GENERAL DEALCUAZ ANNOUNCED TODAY THE RESULTS OF THE SECURITY COUNCIL VOTE ON *THE ADMISSION OF THE* MERCURY CONSORTIUM TO THE UNITED NATIONS. THE VOTE, 11-2 IN FAVOR, WITH NONE OF THE FOUR VETOES EXERCISED, COMES ON THE HEELS OF LAST TUESDAY'S AFFIRMATIVE GENERAL ASSEMBLY VOTE.

. . . AMBASSADORVALE WILL BE INSTALLED IN A BRIEF CEREMONY TOMORROW AT 11 AM EST. THE ADMISSION OF THE MERCURY CONSORTIUM COMES AS AN ABRUPT REVERSAL . . .

. . . IN A RELATED ACTION AIMED AT CEMENTING RELATIONS BETWEEN EARTH AND MERCURY, THE FAMILIES OF ONE HUNDRED PROMINENT GOVERNMENTAL OFFICIALS WILL BE TAKING UP RESIDENCE IN THE SUPER-CITY OF HABITAT FOR AN INDEFINITE TIME . . . ■

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THE TOMKINS **BATTERY** CASE

New developments in society can be defined as new raw material for neuroses.

BUD SPARHAWK

DOUG BEEKMAN

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Lawyer Arthur Coggins could tell that the small, middle-aged woman wanted a divorce when she walked through the door of his office.

"Mrs. Tomkins," he said graciously, waving one hand at the comfortable overstuffed chair beside his desk, "Do have a seat." He noted the woman's clothing as she did so; it was adequate, not off the rack, but not very expensive either. She wore little adornment; small rings and brooch. He couldn't tell if they were real or costume jewelry in the dim light. Small streaks of gray ran through her well-kept hair. Her makeup was subdued, almost negligible. There was a smell of money about her, a fat fee for sure.

"Thank you Mr. Coggins," she said in a nervous voice, and perched on the edge of the chair with her two birdlike hands fluttering over her purse, which she held upright on her lap.

Arthur sat back in his chair and made a tent with his fingers. "Would you care for a drink?" he asked, trying to put her at ease. "Reefers are there near your elbow if you like."

"Oh no, I couldn't drink or smoke!" she whispered, throwing a longing glance at the ivory inlaid roach box. She drummed her purse with her fingers and licked her lips with quick darting motions of her pointed tongue.

Arthur realized that she was not going to take the initiative in the conversation. Some clients were like that; bursting with their problems but afraid to talk to a stranger, him, about them. He snorted; he hated drawing people out: it smacked of soliciting to his mind. Would be far better to have the British system, he thought. There the barrister lets his solicitors, the clerks, soften up the clients and draw out the facts of the case before either one was presented to him, sparing him the drab necessity of thinking about personal involvement, outside factors, or money.

The woman fidgeted in her chair. Arthur sighed, put on a look of moderate disdain and, in a voice loaded with concern, spoke: "My secretary said you had some sort of problem with your husband?"

"Mr. Tomkins? Oh, yes. George. Well!" A look of concern grew on her face. She cast a glance around the room, sweeping her eyes over the shelves tightly packed with leather-bound books. Her glance took in the cut crystal, velvet drapes, aged wood paneling, and the thick Axminster on the floor. She was impressed, as the room was designed to make her feel.

"Come, come, Mrs. Tomkins. I can't help you if you won't tell me what's troubling you." Arthur interjected in his father-confessor tone, guaranteed to bring weeping widows and recalcitrant will-breakers to heel.

"Oh dear. I don't know where to start," she chirped. Her purse

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snapped open and she withdrew a small handkerchief. Arthur noted that it was Bruges lace and added an extra ten percent to his normal fee.

"Why don't you start at the beginning, dear lady." He said. He gave her a small smile, as if pleased that she should honor him with her story. He glanced at the clock on his desk; with luck he could still meet Frank for golf in an hour, if the crosstown traffic wasn't too bad and her problem was a small one.

The delicate lace hankie fluttered to her lips and then dropped to her lap. "The beginning? Oh dear, that's too far back. I mean, you know all about *that!* Er, are you sure that it's all right to talk here, Mr. Coggins?"

"Quite sure, dear lady. The only one who might hear us is my secretary, who is the soul of discretion," he assured her.

"Well, if you think it's all right." She looked questioningly at him. Arthur smiled again and nodded his head. "My husband is George Tomkins: George Alyoisous Grant Tomkins."

Arthur's pencil tip broke abruptly, the splintered point driving through the paper on which he was writing into the padded surface of his desk. He stared at her with wide eyes as his mind raced, dredging up the facts of the case from memory.

G.A.G. Tomkins, '95, Tomkins, Tomkins versus United States, Grundy 95 op cit.

George Tomkins had been a field engineer who, because of his wealthy father, had bribed and influenced his way to a government job. George had been neither more nor less competent than his coworkers and would never have become famous if it hadn't been for a fateful accident: one fine day a poorly designed bridge section had collapsed and crushed poor George's legs to a pulp.

The case resulting from the accident had become a cause célèbre because George and his family had decided that the simple compensation and supportive care called for by his contract were not sufficient recompense. They had sued the federal government for full restitution.

Old Grundy, a young trial lawyer at the time, had himself worked on both sides of the case in the long process of trial, retrial, appeals, and rebuttals. Eventually, thanks to the family fortune, Tomkins et al had won.

"That's when George got his solid state legs," Mrs. Tomkins was saying, her narrative keeping pace with Coggin's racing mind.

George continued to work for another five years before he was involved in a second serious accident; a rocket crash. That one had crushed his torso and destroyed most of his internal organs, and one outside one.

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The family had filed suit against the government even before George's heart had failed. By the time he was on a dialysis machine the courts had decided that the previous ruling on George's medical care still held. The government had dutifully given him artificial kidneys, bladder, pancreas, liver, and other items as good as, or better than, the originals.

"The worst accident he had was when the bomb went off during the riots. A big piece of metal came right through the wall of George's office and hit him in the back of the head," Tomkins' wife went on.

Arthur looked alert. "Oh yes, severed the medulla oblongata, didn't it? How long was he paralyzed?"

The woman wrinkled her face in thought. "About seven months. Then they made that tiny computer thing for the back of his head to take care of his breathing, heart rate, things like that. They put these little wires all through his body because his nerves wouldn't carry the load of that thing. George had to get batteries from the government to power himself. Oh, dear me." She pulled out the handkerchief and began dabbing at her eyes.

"Wasn't there something else? Something special about muscle control?" asked Arthur.

"Y-yes," she sobbed. "They made tapes to program that computer to take care of that. George even made some programs to take care of things such as dressing himself and all. One tape he made took him through the entire day without him having to think at all, although that was later. George used to say he had a tape for everything that was boring in life. He kept them in his dresser drawer, right next to his clean socks."

Arthur asked, puzzlement in his voice, "How could he be a field engineer, then?"

"Oh, the government decided that it was too dangerous to let George work outside where he'd be exposed to all sorts of dangerous things. They gave him an office, a small staff, and a big title. The most dangerous thing he faced was the daily traffic.

"There wasn't much to that job. George found out very early that it was superfluous; just a place for him to be kept safe and sound. He tried to make something out of it but apparently the word was out. It was either that or the fact that they didn't like his ideas and projects. Others got promotions, but not George.

"It began to work on his mind, I believe. He'd become depressed and sit around for days and days, not saying a word. It was all I could do to get him to sign the checks from the trust fund."

"Couldn't you do that yourself?" asked Arthur.

"Heavens, no! George's father made certain that only George

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could sign for the money. I think it was his way of protecting his little boy.

"Now where was I? Oh yes. George began to, well, act strange. I started finding penlite batteries in the pockets of his suits. He told me they were for a quick charge when he got low. I believed him, even though the batteries weren't the ones the government sent each month.

"George also began to spend more and more time in private, especially in that old workshop of his, the one he kept locked. We didn't object because when he finally came out, he'd be smiling and happy. He'd always have a joke or kind word for everyone. Oh, it was so nice to see the change in him.

"Then he began to get, well, forgetful is the only word to use. He'd come home late with no explanation whatsoever, and wouldn't be able to say where he'd been. Days would go by sometimes and he'd never notice."

Mrs. Tomkins leaned forward in her chair, her voice an intent whisper. "Sometimes, when he thought we weren't looking, he'd sneak a package wrapped in brown paper into that workshop of his. Oh, if only we had known . . ." She began to sob. She dabbed at her eyes with the scrap of lace.

"He changed, Mr. Coggins. His attitude toward work, his family—everything—began to change. Sometimes he'd go off for days and days; not at work and not at home. Delivery men would come at odd hours with parcels for George alone. He opened charge accounts at the local hardware stores and service stations. The end of every month would bring huge bills from them.

"I couldn't stand it long. One night I confronted him with the bills he had signed. I showed him the receipts of checks he'd written, and I pleaded with him to let me help him.

"He turned violent, Mr. Coggins. He raged through the house, cursing and throwing things. He used the most vile language of everyone, even me, his own wife! He called me a . . . a . . ."

"Easy, easy, Mrs. Tomkins. Now just compose yourself while I have a word with my secretary." Arthur stood and walked around the desk. He looked down at the crying woman. "Things aren't always so bad as they seem. The law has provisions for people like you, people in unhappy . . . er . . . situations. You just go ahead and cry while I tell my secretary to hold calls." He walked to the door, stepped through, and closed it behind him. His cute blonde secretary looked up.

"Gwendolyn, call Frank and tell him to tee off without me." Arthur opened the top drawer of the file cabinet, the drawer marked "Personal," and took out a tall bottle.

"I'll bet she's a weeper. I can al-

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ways tell, you know." Gwendolyn said, picking up her address book.

Arthur unscrewed the top of the bottle of Black Label and poured a healthy swig into a water glass. "A weeper and a divorce case to boot. Lord, if I get rid of her in two hours I'll be lucky. Oh, call Judge Grundy and tell him that I'll meet him for dinner about seven." He took a long swallow.

"The medical center thing?"

"Yeah. With the elections coming up he's trying to steer clear of any case that might put him on one side of the issue or the other. With everybody in the state arguing about medical benefits he's not about to take a stand that might hurt his chances."

"Brave, isn't he? Was there anything else?" Gwendolyn smiled.

"Yes. Call me in a half hour and ask me to come out here. Be sure to have some ice ready, too. I hate these warm drinks." He placed the bottle back in the drawer and set the empty glass on top of the ice bucket, which was neatly disguised as a dictionary. He straightened his tie and opened the door.

Mrs. Tomkins had composed herself, as instructed. Arthur smiled at her as he settled into his place behind the desk. He patted her hand reassuringly: "We have all the time in the world, dear lady. We won't be disturbed."

"Oh, I feel so bad about using up your time like this." she said.

At a hundred an hour, plus another fifty for ruining my golf date I can bear it, Arthur thought. Aloud he said, "That's all right, madam. I'm here to serve all that need the law's protection."

"Thank you, Mr. Coggins. You don't know how good it feels to talk about all this."

"You were saying that your husband became angry with you, I believe," he prompted.

"Not angry. He was a wild man. He screamed and yelled and broke up the house terribly. One night he put his foot through a beautiful old clock because the chimes were getting on his nerves.

"It was that way all of the time after that. On one evening he ran through the house screaming that there were huge green can openers after him. He kept yelling about wet grounds, or something along those lines. Oh, Mr. Coggins, he was in terrible shape!"

Arthur chewed his lip: Had something gone wrong medically? If that was true then this case would really put Grundy on the spot—his area of jurisdiction and all. Oh my!

"We put him to bed and tried to keep him quiet. But he was like a madman, thrashing and groaning around for hours and hours. Nobody could reason with him, or even talk to him for that matter."

"Did you call in the doctors?" Arthur asked.

"At first we did. They couldn't find anything wrong with him. Said

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it was obviously some nonmedical disability."

"I take it that they were the government doctors?" Arthur said dryly.

"Naturally. Of course we stopped asking after that. Now, where was I? Oh yes! One night after a particularly bad episode I took his key and went into his workshop.

"It was a mess. Batteries were everywhere; all over the floor and workbenches. Some were cracked open and others were covered with green crystals. We checked them and found that every one of them was drained.

"It didn't take long to figure out that George was using them somehow to get himself all charged up. We couldn't imagine what those odd-sized batteries were doing to his body full of little silver wires."

"The poor man," nodded Arthur.

"Yes," sobbed Mrs. Tomkins. "We tried to help him, but he didn't want help, not really. I tried cutting off his supply but when he tried to use a wall socket for a quick one it nearly killed him. After that I let him have a ration of batteries. It was better then having him dead!

"We thought that therapy might work for awhile, so we very discreetly had a few electrical engineers come in and talk to him, to tell him about the dangers of fooling around with electricity. They even loaned him their books on batteries so George could find out how dangerous they were. I'm afraid that it all went for nothing. In reading the books, George discovered a new potential."

"Shameful," murmured Arthur.

"We even called in a common electrician, one that the engineers said was an expert on wiring. He talked to George for days, he even brought in vivid pictures of electrical fires started by overloaded wiring to show him where his life was leading.

"But it didn't work. Nothing worked! I'd find little things, like the penlites in his pockets for those quick pick-me-ups. I even found a huge battery hidden under his bed. He just laughed when I confronted him with it."

"So there was nothing you could do?" asked Arthur.

"No, nothing. I thought about leaving him but there were the children, you see. I had to shield them from their father's vicious habit. Oh, and that was the most horrible part! He'd even bribe our little Tommy, his own son, to run out and buy flashlight batteries at the corner store."

"The filthy beggar," Coggins exclaimed.

"Mr. Coggins, you *do* know what it means to be a woman and alone in the world, with no one to turn to, to see your husband wasting away before you," she began to sob again.

Arthur took her hand in his, patting it lightly. "Oh, I do know,

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dear lady, I do." He also noticed that the stones on the rings were indeed real, and very expensive. He added another five percent to his fee.

"Excuse me, I must see my secretary again, Mrs. Tomkins." He gave her hand one last pat and walked into the reception room.

Gwendolyn looked up: "So soon? I haven't got the ice yet, if that's what you want."

Arthur put a finger to his lips and motioned at the door. "Quiet. Look sweetheart, this case is big, bee-eye-gee. I want you to get Judge Grundy on the phone and tell him to meet me here for dinner. Then call Jim, Ted, and Robby and tell them I want them to put together the best divorce team we can get. Tell Dick to start a survey of the Tomkins' estate: I want to know George Tomkins' net worth, disposable income—everything! Oh yes, one other thing; put in that order for the real fur coat for yourself. We, my dear, are going to be in clover."

Mrs. Tomkins was leaning back in her chair when he returned. She had the ivory inlaid box in her hands. She looked up at him. "Do you mind?" she said. "I'm so distraught I just have to calm myself."

Arthur flicked his gold lighter to life with practiced ease; it wouldn't hurt at this stage for her to loosen up a little. "Go ahead, my dear. May I call you Eleanor? And please call me Art, yes?" He crinkled his eyes in his sincere, confident smile, and added another two percent to his fee when she returned it.

Eleanor held the butt in one delicate hand and let the heavy smoke trickle from her nose. "Oh yes. That's much better." she said.

"The worse hadn't come at that time," she continued as if there had been no break at all. "In the late fall the children and I went out of town to visit some friends, the only ones I had left, really. The night we were to return I had a . . . a premonition, and decided to leave the children for a few more days and go home alone.

"The house was dark when I arrived, even though it was only early evening. I let myself in a side door, it had been left unlocked, and felt my way through the house to the living room, where I turned on the lights." She took another deep drag on the reefer, letting the sweet smoke fill her lungs. Arthur could see the care lines erasing off her face.

"The room was a shambles. Distilled water, jumper cables, and packs of sulphuric acid were all over the room. Holes had been eaten into my furniture and rug by the spilled acid. Empty battery cases were laying all over the place. In the hall they were so thick that you couldn't walk without stepping on one. I was so glad the children weren't along to see it!

"I heard a noise from above; a

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low sort of moan. Being very quiet I picked my way up the stairs between the trash. The moan seemed to be coming from George's room." Eleanor leaned forward, her voice becoming more intense.

"I stood outside his door for a long while, afraid to open it and afraid not to. That's when I caught a whiff of ozone. Without pausing any longer I threw open the door and turned on the light.

"The room was upset from one end to another with clothes laying about. I recall George's pants were oddly perched atop the floor lamp, where he had thrown them. In the middle of the room was George's bed and on it was . . . was," she trembled slightly.

Arthur took the roach from her fingers and stubbed it out. "Go on, go on," he urged.

Eleanor straightened, once more the proper lady. "As I said, George was lying in the middle of the bed. Beside him, with both arms around his neck was a . . . a . . . bright blue battery-charging unit! It was plugged in and running high. I noticed it was set on trickle charge before I turned away in disgust.

"That's when I saw the pliers lying there beside my foot. Without thinking I snatched them up, ran to the bed, and threw them at the machine. Everything went black after that."

"You poor dear," Arthur temporized, wondering what category the case would fall into—alienation of induction perhaps?

"When I came to it was morning and the room was strangely still. I reached out and touched George: he was cold and still, a smile on his lips. I'm afraid that the pliers had shorted out the battery charger and killed him!"

Arthur stood in alarm: "Killed him! You mean you're not here for a divorce? Oh God! No, don't say another word!" He shuffled his papers on the desk hurriedly, thinking hard.

"Just a moment. I'd better have my secretary cancel the rest of my appointments. Today. Just sit there. Have another smoke, take two or so. I'll be right back."

Arthur leaned heavily against the door to his office and took a deep breath.

Gwendolyn turned and stared at him. "What . . ." she began.

Arthur spoke, "Call Grundy, tell him to get right over here, now! Call Dick and tell him to look at probate as well on the Tomkins case; wills and such you know. And tell him for God's sake to keep it quiet.

"After that call Jim, Ted, and Robby. Tell them to cancel the divorce team business, apologies and all that. See if you can find the number for Platt, Whitney, Burrows, and Klein; call them and put them on retainer."

"Aren't they the tax people?" Gwendolyn queried.

"Criminal. You're getting them

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confused with Whitt, Paisly, et al." He smashed the palm of one hand with his fist: "Bother! When you call Grundy ask him to bring along his volume of Blackburn, Bries for me.

"Let me know when you get all that done."

Gwendolyn finished writing on her shorthand pad with a flourish. "Sounds important. I take it the weeper's not a divorce."

"Heavens no, something far more lucrative, my dear. It looks like a crime of passion," Arthur mused, smirking.

"You mean sex, eternal triangles, drunken orgies, wild weekends and all that?" Gwendolyn grinned as she started to dial Judge Grundy's number.

Arthur looked out the window, deep in thought: "Perhaps," he said, "If the fee is high enough . . ." Gwendolyn blushed.

Eleanor was relaxed in her chair, a golden glass of Haig in her hand. She was swinging her head from one side to another in time with some distant drummer, unheard by all but herself.

Arthur sniffed: Didn't she realize what she had just told him? Was the woman insane, to admit killing her husband and then to become so relaxed? He listened for the sound of the police knocking on his door.

"Say, this is good stuff," Eleanor said, holding up the glass. "I haven't felt this good in years, not since old George died."

Arthur fell back in his chair. "Years!" he said weakly. "I thought you had just murdered him."

Eleanor's eyes widened. "Murder! Why Art, what makes you say that? My husband's a successful government executive. Why, he got another promotion only last week."

"But I thought you said . . ." Arthur blustered.

"Oh, *that!*" She giggled. "When I found that George was dead from the pliers I was so distraught that I stumbled to the dresser. There, in a half-opened drawer, I saw the tape George had programmed to get him through the workday. I pulled it out and put it in him.

"George got off the bed, stretched, then walked into the bath to take his shower, got dressed, and went off to work.

"That was six years ago.

"To this day George has had the same routine. It hardly ever varies. Every action at home is identical to the one on the tape. I assume that he is equally as repetitious at his office, but that can't be so bad because of the promotions and all, could it?" She looked at Arthur.

Arthur shrugged numbly.

"George is so nice to our friends and children now. So long as we keep changing the tapes he does everything he's supposed to do. Why, do you know, he's even built a reputation as a sparkling cocktail party conversationalist?

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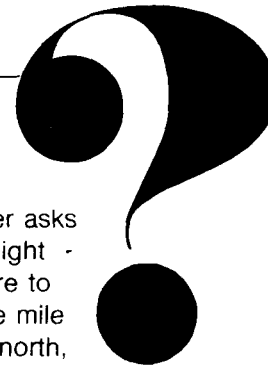
"How can you talk about me murdering George? No, what I came to see you about was this." She fumbled with her purse, extracted a legal-sized envelope and laid it on the desk top. Arthur could see the caduceus of the Federal Medical Corps at one corner.

"That came yesterday," she went on. "George had a physical a few months ago and they found out that he was dead. The letter says that they're going to cut off the medical payments."

"Because he's dead," repeated Arthur.

Eleanor Tomkins smiled. "Yes, darling. That's why I need you to understand the whole story. I want to find out how we can fight this. George could lose his job, the trust fund—everything we have if they make this stick.

"After all, since George is the perfect husband now, and a real success in the government, I see no reason why things should change over some minor medical point!" ■



A well-known brain teaser asks where on earth a man might stand such that if he were to walk one mile south, one mile east, and then one mile north, he would return to the same spot from which he had departed. The obvious answer is the North Pole. However, there are other places for which this is true. Where are they?

ANSWER:

Any point $1 + 1/2^{\pi}$ miles north of the South Pole. Walking one mile south would place him on a circle of one mile circumference centered on the pole. Walking one mile east, he would circumnavigate the globe at that latitude, returning to a point from which he could retrace his steps one mile north to his point of origin.

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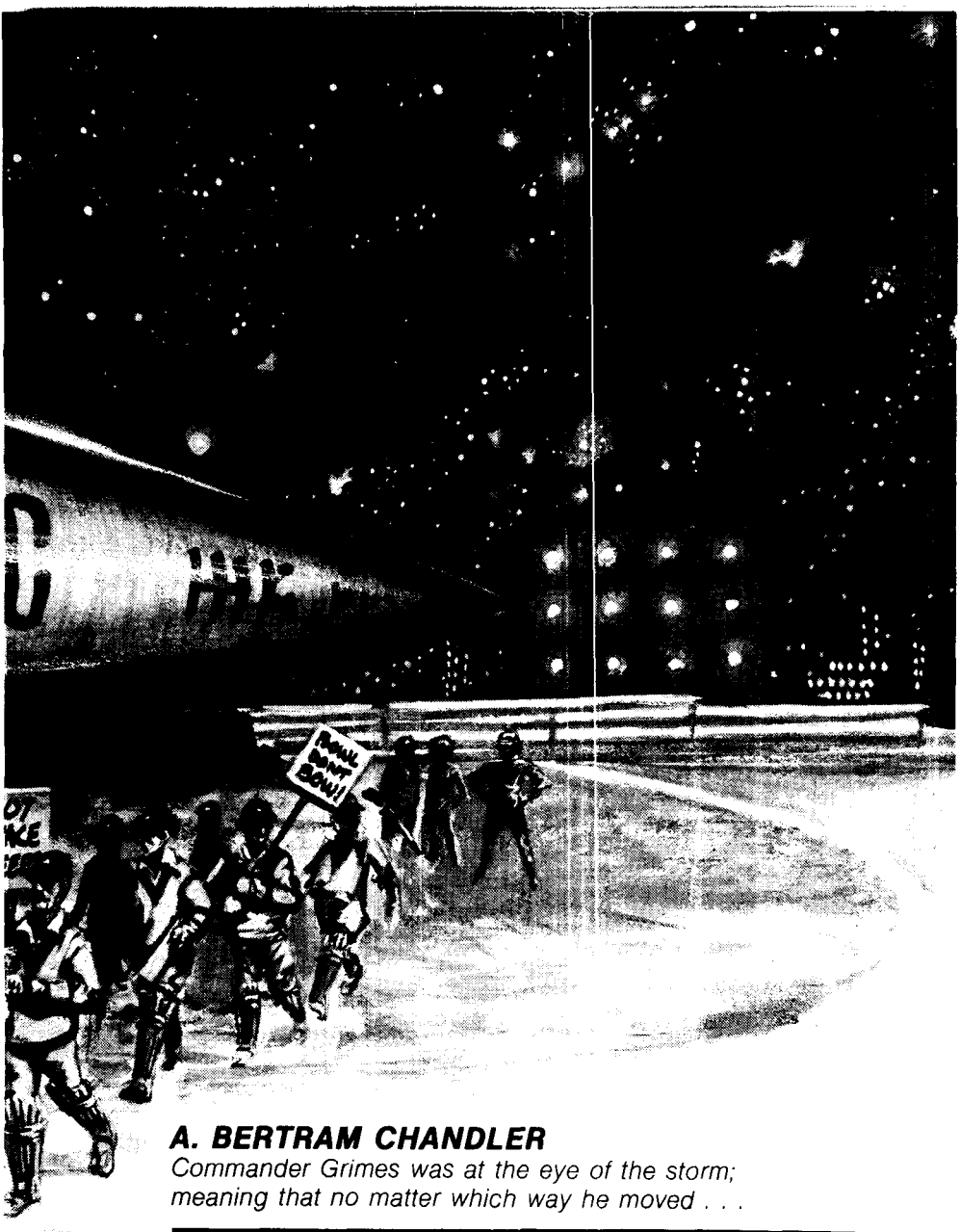

A. BERTRAM CHANDLER

Commander Grimes was at the eye of the storm; meaning that no matter which way he moved . . .

THE FAR **TRAVELLER**

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The Far Traveller came to Botany Bay, to Paddington, dropping down to the Bradman Oval—which sports arena, since the landing of the Survey Service's *Discovery*, had become a spaceport of sorts. *Discovery* was gone, to an unknown destination, taking with her the mutineers and the friends they had made in the newly rediscovered Lost Colony. The destroyer *Vega*, dispatched from Lindisfarne Base to apprehend the mutineers, was still in the Oval, still lying on her side, inoperative until such time as the salvage tugs should arrive to raise her to the perpendicular. *Discovery*, under the command of her rebellious first lieutenant, had toppled the other ship before making her escape.

John Grimes, lately captain of *Discovery*, was still on Botany Bay. He had no place else to go. He had resigned from the Survey Service, knowing full well that with the loss of his ship his famous luck had run out, that if he ever returned to Lindisfarne he would have to face a court martial and, almost certainly, would be held responsible for the seizure by mutineers of a valuable piece of Interstellar Federation property. And, in all likelihood, he would be held to blame for the quite considerable damage to *Vega*.

In some ways, however, he was still lucky. He had a job, one for which he was qualified professionally if not temperamentally. Botany Bay, as yet, owned no spaceships of its own. (The lost in space *Lode Wallaby*, bringing the original colonists, had crashed on landing and, in any case, the cranky lodejammers had been obsolete for generations.) Nonetheless, Botany Bay now needed a spaceport; since the news of *Discovery's* landing had been broadcast throughout the galaxy an influx of visitors from outside was to be expected. A spaceport needs a Port Captain. Even if Grimes had not been on more than friendly terms with Mavis, Mayor of Paddington and President of the Council of Mayors, he would have been the obvious choice.

Obvious—but not altogether popular. *Vega's* people were still on Botany Bay and all of them blamed Grimes for the wreck of their vessel and, come to that, Commander Delamere, the destroyer's captain, had always hated Grimes' guts. (It was mutual.) And there were the parents whose daughters had flown with the *Discovery* mutineers—and quite a few husbands whose wives had done likewise. Irately vociferous, too, were the cricket enthusiasts whose series of test matches had been disrupted by the cluttering up of the Oval with spaceships . . .

Only the prompt intervention of the local police had saved Grimes, on one occasion, from a severe beating up at the hands of a half dozen of Delamere's Marines. There had been no police handy

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when a husband whose wife had flown the coop with *Discovery's* bo's'n gave Grimes two black eyes. And he was becoming tired of the white-clad picketing cricketers outside his temporary office chanting, "Terry bastard go home!"

Then *The Far Traveller* came to Botany Bay.

She was not a big ship, but large for what she was, a deep space yacht. Her home port—Grimes had learned during the preliminary radio conversations with her master—was Port Bluewater, on El Dorado. That made sense. Only the filthy rich could afford space yachts—and El Dorado was the planet of the filthy rich. Grimes had been there once, as a junior officer in the cruiser *Aries*, and had been made to feel like a snotty-nosed urchin from the wrong side of the tracks. He had been told, however, that he would be welcome to return—but only after he had made his first billion credits. He did not think it at all likely that he ever would return.

The Far Traveller dropped down through the clear, early morning sky, the irregular beat of her inertial drive increasing from an irritable mutter to an almost deafening clatter as she fell. The rays of the rising sun were reflected dazzlingly from her burnished hull. There was a peculiarly yellow quality to the mirrored light.

Grimes stood on the uppermost tier of the big grandstand watching her and, between times, casting an observant eye around his temporary domain. The triangle of scarlet beacons was there, well clear of the hapless *Vega*, the painfully bright flashers in vivid contrast to the dark green grass on which they stood. At the head of each of the tall flagstaffs around the Oval floated the flag of Botany Bay—blue, with red, white and blue superimposed crosses in the upper canton, a lopsided cruciform constellation of silver stars at the fly.

He was joined by the Deputy Port Captain. Skipper Wheeldon was not a spaceman—yet. He had been master of one of the big dirigibles that handled most of Botany Bay's airborne cargo and passenger trade. But he wanted to learn and already had a good grasp of spaceport procedure.

He said, "She's coming in nicely, sir."

Grimes grunted dubiously, "Mphm." He filled and lit his pipe. He said, speaking around the stem, "If I were that captain I'd be applying more lateral thrust. Can't he see that he's sagging to leeward? If he's not careful he'll be sitting down on top of *Vega* . . ."

It seemed almost as though the El Doradan shipmaster had overheard Grimes. The note of the inertial drive changed, the beat becoming more rapid, as the incoming ship added a lateral component to her controlled descent.

She was falling slowly now, very slowly, finally hovering a scant me-

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ter over the close-cropped grass. She dropped again, almost imperceptibly. Grimes wasn't sure that she was actually down until the inertial drive was shut off. The silence was almost immediately broken by the shouts of the picketing, bat-brandishing cricketers—kept clear of the landing area by slouch-hatted, khaki-clad police—shouting, "Terry, go home! Spacemen, go home!"

A telescopic mast extended from the needle prow of the golden ship. A flag broke out from its peak—dark purple and on it, in gold, the CR monogram. The Galactic Credit sign—and the flag of El Dorado.

"I suppose we'd better go down to roll out the red carpet," said Grimes.

Grimes stood at the foot of the slender golden tower that was *The Far Traveller*, waiting for the after airlock door to open, for the ramp to be extended. With him were Wheeldon, and Jock Tanner, the Paddington chief of police who, until things became properly organized, would be in charge of such matters as immigration and port health formalities. And there was Shirley Townsend, the Mayor's secretary. (Mavis herself was not present. She had said, "I just might get up at sparrowfart to see a king or a queen or a president comin' in, but I'm damned if I'll put meself out for a mere millionaire from Port Bluewater, El Dorado."

"Takin' their time," complained Tanner.

"Perhaps we should have gone round to the servants' entrance," said Grimes, half-seriously.

The outer door of the airlock slowly opened at last and, as it did so, the ramp extruded itself, a long metal tongue stretching out to lick the dew that still glittered on the grass. Like the shell-plating of the ship it was gold—or, thought Grimes, gold-plated. Either way it was ostentatious.

A man stood in the airlock chamber waiting to receive them. He was tall, and thin, and his gorgeous uniform, festoons of gold braid on dark purple, made him look like an animated totem pole. His lean face bore what seemed to be a permanently sour expression. Among the other gleaming encrustations on his sleeve Grimes could distinguish four gold bands. So this was the captain . . . And why should the captain be doing a job usually entrusted to, at best, a senior officer—the reception of port officials?

He looked down at the boarding party. He decided that Grimes—in a slightly modified airship captain's uniform, light blue, with four black bands on each epaulet, with a cap badge on which the silver dirigible had been turned through ninety degrees to make it look like a spaceship, was in charge. He said, "Will you come aboard, please? The Bar-

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oness d'Estang will receive you in her sitting room."

Grimes led the way up the ramp. "Grimes, Acting Port Captain," he said, extending his hand.

"Billinger, Master *de jure* but not *de facto*," replied the other with a wry grin.

Grimes wondered what was meant by this, but discreet inquiries could come later. He made the necessary introductions. Then Captain Billinger led the party into an elevator cage. He pushed no buttons—there were no buttons to push—merely said, "Her Excellency's quarters."

The locals were impressed. Grimes was not. Such things were common enough on the worlds with which he was familiar. The ascent was smooth. They disembarked into a vestibule. A door before them slid silently open. Billinger led the way through it. He bowed to the tall, slim woman reclining on a *chaise longue* and announced, "The port officials, Your Excellency."

"Thank you, Captain," she replied in a silvery voice, adding, "You may go."

Billinger bowed again, then went.

Grimes looked down at the Baroness, and she up at him. She was slim but rounded, the contours of her body revealed rather than hidden by the flimsy white translucency that enrobed her. There was a hint of pink-nippled breasts, of dark pubic shadow. Her cheekbones were high, her mouth wide and full, her chin not overly prominent but firm, her nose firmly arched. Her lustrous bronze hair was braided in the semblance of a coronet in which flashed not-so-small diamonds. Even larger stones, in gold settings, depended from the lobes of her delicate ears.

She reminded Grimes of Goya's Maja—the draped version—although she had far longer legs. And the furnishings of her sitting room must be like—he thought—the furnishings of the boudoir in which that long ago and faraway Spanish aristocrat had posed for the artist. Certainly there was nothing about these surroundings that even remotely suggested a spaceship.

He was abruptly conscious of his not at all well-tailored uniform, of his far from handsome face, his prominent ears. He felt these flushing hotly, a sure sign of embarrassment.

She said, "Please sit down, Acting Port Captain—although I assume that the rank is *de facto* as well as *de jure*. And you, Deputy Port Captain. And you, City Constable. And, of course, Miss Townsend . . ."

"How did you . . .?" began Shirley. (It came out sounding like "'Ow did yer . . .?")

"I heard, and watched, the introductions," said the Baroness, waving a slim, long hand towards what looked like an ordinary, although

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ornately gold-framed, mirror.

The City Constable fidgeted on a spindly-legged chair that looked as though it were about to collapse, at any moment, under his weight. He said, "If you'll excuse me, Baroness, I'll go an' see the skipper about the port formalities . . ."

"They will be handled here," said the Baroness firmly. She did not actually finish the sentence with *my man,* but the unspoken words hung in the faintly scented air. She went on, "I have never left business to underlings." She clapped her hands. A man, dressed in old-fashioned servant's livery, white frilled shirt and scarlet, brass-buttoned waistcoat over black knee breeches, white stockings and black shoes, entered silently. A man? He was, Grimes realized, one of those humanoid serving robots that he had become familiar with during his stay on El Dorado, years ago. He—it?—was carrying folders of documents—clearances, crew and passenger lists, store lists, declarations, manifests. Without hesitation he handed the papers to the police officer.

"And now," asked the Baroness, "will you take refreshment? I know that, by your time, it is early in the day—but I have never known Spumante Vitelli to come amiss at any hour of the clock."

"Spumante Vitelli?" asked Shirley Townsend. "Sounds like an emetic . . ."

"It's an El Doradan wine," said Grimes hastily. "From Count Vitelli's vineyards."

"You know El Dorado, Port Captain?" asked the Baroness, polite but condescending surprise in her voice.

"I've been there," said Grimes. "Some years ago."

"But this is a Lost Colony. You have had no space travel since the founders made their chance landing."

"Commander Grimes is out of the Federation's Survey Service," said Jock Tanner.

"Indeed?" The pencil-thin eyebrows arched over the dark, violet eyes. "Indeed? *Commander* Grimes? There was—I recall—a Lieutenant Grimes . . ."

"There was," said Grimes. Then—the memories were flooding back—"Do you know the Princess Marlene von Stolzberg, Your Excellency?"

The Baroness laughed. "Slightly, Port Captain or Commander or whatever you are. She's too much of the Hausfrau, fat and dowdy, for my taste."

"Hausfrau?" echoed Grimes bewilderedly. "But . . ."

"Many women change, and not at all for the better, when they become mothers . . ." She went on maliciously, "And what about the father? As I recall it, there was a scandal. You, and Marlene, and that mad old Duchess, and poor Henri . . . It's a small universe, John Grimes, but I never did meet

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you on El Dorado and I never dreamed that I should meet you here . . ."

The robot servitor was back, bearing a golden (of course) tray on which was a golden icebucket with a magnum of the Spumante, gold-rimmed crystal goblets. He poured, serving his mistress first. Glasses were raised in salute, sipped from.

"Not a bad drop o' plonk," said Shirley, with deliberate coarseness.

The City Constable, doing his best to create a diversion, put his glass down on the richly carpeted deck, picked up the papers. "John," he said, "you know more about these things than I do . . . This clearance from Tallifer . . . Shouldn't it be signed by the Chief Medical Officer?"

"Not necessarily," said Grimes, putting his own glass down and getting up from his chair, walking across to the police officer. "But I think we'd better get Shirley—she's used to wading through bumf—to make sure that everything has been signed by a responsible official."

"Orl right," grumbled the girl. "Orl right." She drained her glass, belched delicately, joined Grimes and Tanner. The hapless Wheeldon, out of his depth and floundering, was left to make polite conversation with the Baroness.

Shortly thereafter *The Far Traveller* was granted her Inward Clearance and the boarding party trooped down the golden gangway to the honest turf of Botany Bay.

"You do have posh friends, John," said Shirley Townsend as soon as they were down the ramp.

"I didn't have any friends on El Dorado," said Grimes, not altogether truthfully and with a note of bitterness in his voice.

Captain Billinger was relaxing. He did not look happy, but his long face had lost some of the lines of strain. He had changed from his fancy dress into more or less sober civilian attire—a bright orange shirt worn over poisonously green slacks. He was sitting with Grimes at a table in the saloon bar of the Red Kangaroo.

He gulped beer noisily. "Boy," he said, "boy, oh boy, am I glad to get off that rich bitch's toy ship!"

"But you're rich yourself, surely," said Grimes. "You must be, to be an El Doradan . . ."

"Ha! Me an El Doradan! That'd be the Sunny Friday! No, Captain, I'm just a poor but reasonably honest Dog Star Line second mate. *Beagle* happened to be on Electra when her ladyship was there to pick up her super-duper yatchet. Seems that she came there on an El Doradan ship—they do have ships, you know, and a few playboy spacemen to man 'em—and assumed that she'd be allowed to lift off in her own fully automated vessel without having a qualified master on board. But Lloyds'—may the Odd Gods of the galaxy rot their

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socks!—got into the act. No duly certificated master astronaut on the Register, no insurance coverage. Money talks—and it seems that more than just a couple or three Dog Star Line shares are held by El Doradans. Anyhow, the Old Man got a Carlottigram from Head Office—I'd like to know what it said!—and, almost at once, called me up to his sanctum and turned on the hard sell. Not that there was any need for it. The offer of a master's job at well over *our* Award rates for masters . . . Only a yachtmaster, it's true—but master nonetheless and damn' well paid. Like a mug, I jumped at it. Little did I know . . ." He finished his beer and waved two fingers at the near-naked, plumply attractive blonde waitress to order more.

"So you don't like it, Captain," said Grimes.

"You can say that again, Captain. And again. A rich bitch in a solid gold spaceship . . ."

"Gold plated, surely," interjected Grimes.

"No. Gold. G-O-L-D."

"But gold's not a structural material."

"It is after those eggheads on Electra have finished with it. They rearrange the molecules. Or the atoms. Or something."

"Truly fantastic," commented Grimes.

"The whole bloody ship's fantastic. A miracle of automation or an automated miracle. A human captain's just a figurehead. You saw the landing yesterday?"

"Of course. After all, I am the Port Captain. There was something a bit . . . odd about it. I can guess now what it must have been. The ship was coming down by herself and making a balls of it—and then *you* had to take over."

Billinger glared at Grimes. "Ha. Ha bloody ha! For your information—*I* was bringing her down. At first. Yes, I know damn' well that there was drift. I was showing off, see. At the last possible moment I was going to make a spectacular lateral hedge-hop and sit down bang in the middle of the beacons. And then *She* had to stick her tits in. 'Take your ape's paws off the controls,' she told me. 'The computer may not be as old as you—but it knows more about ship handling than you'll ever learn in your entire, misspent life!' "

The waitress brought two fresh pots of beer. Grimes could tell by the way she looked at Billinger that she liked him. (She would know, of course, who he was—and would be assuming that he was, as captain of a solid gold spaceship, rich.)

"Thank you, dear," said Billinger. He leered up at her and she simpered down at him. She took the banknote—of far too large a denomination—that he handed her, began to fumble in the sporran that was, apart from high-heeled sandals, her only clothing, for the change.

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"That will be all right," said Billinger grandly.

Throwing money around like a drunken spaceman, thought Grimes.

"And what are you doing tonight after you close, my dear?" went on Billinger.

"If you wait around, sir, you'll find out," she promised, her simper replaced by a definitely encouraging smile.

She left the table reluctantly, her firm buttocks seeming to beckon as she moved away.

"I believe I'm on to something there," murmured Billinger. "I do. I really do. And I deserve it. I've been too long cooped up in that space-going trinket box with that rich bitch flaunting the body beautiful all over the whole damned ship—and making it quite plain that there was nothing doing. You can look but you can't touch—that's her ladyship!"

Grimes remembered his own experiences on El Dorado. He asked, however, "What exactly is she doing out here?"

"Research. Or so she says. Her thesis for a doctorate in some damn science or other. Social evolution in the Lost Colonies. Not that she'll find much to interest her here. Not kinky enough. Mind you, this'd be a fine world for an honest working stiff like me . . ." He stiffened abruptly. "Talk of the devil, look who's here . . ."

"Of *two* devils . . ." said Grimes.

She swept into the crowded barroom, the gleaming length of her darkly tanned legs displayed to advantage by a skirt that was little more than a wide belt of gold mesh, topped by a blouse of the same material that was practically all décolletage. Her dark-gleaming hair was still arranged in a jewel-studded coronet. She was escorted—by no less a person than Commander Delamere. Handsome Frankie was dressed for the occasion in mess full dress, spotless white linen, black and gold, a minor constellation of tinkling miniatures depending from rainbow ribbons on the left breast of his superbly cut jacket. They were no more than Good Attendance medals, Grimes knew—but they looked impressive.

The handsome couple paused briefly at the table at which Grimes and Billinger were seated.

"Ah, *Mr.* Grimes . . ." said Delamere nastily.

"*Captain* Grimes," corrected Grimes.

"A civilian, courtesy title," sneered Delamere. "A . . . Port Captain."

He made it sound at least three grades lower than Spaceman, Fourth Class. (Grimes himself, come to that, had always held Port Captains in low esteem—but that was before he became one himself.)

"Perhaps we should not have come here, Francis," said the Baroness.

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"Why shouldn't you?" asked Grimes. "This is Liberty Hall. You can spit on the mat and call the cat a bastard." He knew that he was being childish but was deriving a perverse pleasure from the exchange.

"Come, Francis," she said imperiously. "I think I see a vacant table over there. A very good night to you, Port Captain. And to you . . . Captain Billinger? Of course. I did not recognize you out of your livery."

She glided away. She was the sort of woman who would look and move like an aristocrat no matter what she was or was not wearing. Delamere, a fatuous smirk on his too regularly featured face, followed.

Billinger scowled. "It's all very well for you, Captain," he complained, "but I have to work for that bitch."

"My nose fair bleeds for you," said Grimes unfeelingly.

So Delamere was a fast worker. And Delamere, as Grimes well knew, was the most notorious womanizer in the entire Survey Service. And he *used* women. His engagement to the very plain daughter of the Admiral commanding Lindisfarne Base had brought him undeserved promotions. But Delamere and this El Doradan Baroness? That was certainly intriguing. Who would be using whom? Grimes, back in his quarters in the Mayoral Palace, lay awake in the wide bed pondering matters; in spite of the large quantities of beer he had consumed he was not sleepy. He was rather sorry that Mavis, the Mayor, had not come to him, as she usually did. Apart from anything else he would have liked to talk things over with her.

Delamere and the Baroness . . .

The Baroness and Delamere . . .

He wished them joy of each other.

He wished Billinger and the little blonde waitress joy of each other as well.

But a vague premonition kept nagging at him. Something was cooking. He wished that he knew what it was.

•

Two mornings later he found out.

Billinger stormed into his office atop the grandstand just as he was sitting down to his elevenses, tea freshly brewed by Shirley who, by now, was working for him as much as for the Mayor.

"This is too much!" yelled *The Far Traveller's* captain.

"Calm down, calm down," soothed Grimes. "Take a pew. Have a cuppa. And a scone."

"Calm down, you say? How would *you* feel? I was engaged as a yachtmaster, not a tugmaster. I should have been consulted. But *she,* as usual, has gone over my head!"

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"What *is* all this?" asked Grimes.

"You mean you don't know either, Captain?"

"No. Sit down, have some tea and tell me all about it. Shirley—a cup for Captain Billinger, please."

"*She*," said Billinger after a tranquilizing sip, "is rolling in money—but that doesn't stop her from grabbing every chance to make more of the filthy stuff. *She* has signed a contract with your pal Delamere, engaging to raise *Vega* to lift-off position. *She* just happened to mention it to me, casual-like."

"You're not a tugmaster," said Grimes, "and a space yacht is certainly not a tug. Looks to me as though she's bitten off more than she—or you—can chew."

"Maybe not," said Billinger slowly. "Maybe not. She's a powerful little bitch—*The Far Traveller*, I mean. She's engines in her that wouldn't be out of place in a battleship. But I should have been consulted."

"So should I," said Grimes. "So should I. After all, this is *my* spaceport, such as it is . . ." And then, more to himself than to the other, a cheerful note creeping into his voice, "But Frankie won't be too popular signing away a large hunk of the taxpayers' money when the Survey Service's own tugs are well on the way here."

"They're not," said Billinger. "It seems that there's some indefinite delay. Delamere got a Carlottigram about it. Or so *she* mentioned."

"And so Frankie keeps his jets clear," murmured Grimes in a disappointed voice. "He would."

And how would this affect *him?* he wondered. *Vega* lying helpless on her side was one thing, *Vega* restored to the perpendicular, to the lift-off position, would be an altogether different and definitely dangerous kettle of fish. Even should her drives, inertial and reaction, require adjustments or repairs she would be able to deploy her quite considerable weaponry—her cannon, missile launchers and lasers. The city of Paddington would lie at her mercy.

And then?

An ultimatum to the Mayor of Paddington?

Deliver the deserter, ex-Commander Grimes, to Federation's Survey Service custody, so that he may be carried to Lindisfarne Base to stand trial?

Hardly. Handsome Frankie wouldn't dare. Botany Bay was almost in the backyard of the Empire of Waverley and, thanks to certain of *Discovery's* technicians, now possessed its own deep space radio equipment, the Carlotti communications and direction finding system. A squeal to the Emperor—who had been getting uppish of late—and Imperial Navy cruisers would be hot-footing it to this sector of space. There would be all the makings of a nasty interstellar incident. And, in any case, H.I.M.S. *Robert*

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Bruce was already *en route* to Botany Bay to show the thistle flag.

But what was Billinger saying?

". . . interesting problem. It wouldn't be so bad if she'd let *me* handle it. But not her. It'll either be that bloody computer *or* that popinjay of an F.S.S. commander, or the pair of 'em working in collusion. With *her* sticking her tits into everything."

"And, of course," said Grimes, just to cheer him up, "you, as master, will be legally responsible if anything goes wrong."

"Don't I know it. For two pins I'd resign. I'd be quite happy waiting here for another ship to come along. After all, I've a pile of credits due in back pay. But I suppose I'd better get back to my noble vessel to see what's been cooked up in my absence."

"I'll come with you," said Grimes.

The pair of them stood in the Baroness' boudoir. She did not ask them to sit down. She, herself, was not reclining decoratively on her *chaise longue* but seated at a *secrétaire,* a gracefully designed desk—excellent reproduction or genuine antique?—with rich ormolu decoration. That desk, thought Grimes, was almost certainly a reproduction. His mind was a repository of scraps of useless knowledge and he remembered that the original ormolu had been brass imitating gold. Only the genuine metal would do for the Baroness.

She looked up from the papers before her. A pair of heavy, old-fashioned spectacles, black framed, went oddly with her flimsy gown, but suited her. She said, "Captain Billinger, I believe that you, as master, are required to sign the contract. I, as owner, have already signed."

Sulkily Billinger went to stand by the ornate desk, produced a stylus from a breast pocket of his gaudy uniform, and bent to scribble his name.

"And Port Captain Grimes . . . I understand that I should ask your permission to engage in . . . to wage? . . . within the spaceport limits."

"That is so, Your Excellency," said Grimes.

"I assume that the permission is granted."

Grimes was tempted to say no, but decided against it. Commander Delamere represented the Survey Service, and the Baroness d'Estang represented El Dorado, with its vast wealth and influence. It is futile to fart against thunder.

He said, "Yes."

"Good. No doubt you gentlemen feel that you are entitled to be apprised as to what has been arranged between Commander Delamere and myself. The commander will supply the tow wires from his stores. It will be necessary to pierce *The Far Voyager's* hull about the stern to secure the towing lugs. I

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understand that the welding of steel on to gold is impracticable—and, of course, the . . . modified gold that was used to build the ship on Electra is not obtainable here. Commander Delamere assures me, however, that his artificers will be able to make good the hull after the job has been completed. All dust and shavings will be carefully collected and melted down to plug the holes." She turned in her chair to address Billinger. "All relevant data has been fed into the computer." She permitted herself a smile. "You will be pleased to learn, Captain, that it does not feel itself competent to undertake what is, in effect, salvage work. The programmers back on Electra did not envisage any circumstances such as those that have arisen now." She looked positively happy. "The guarantee has not yet expired, so I shall be entitled to considerable redress from Electronics and Astronautics, Incorporated." She paused, looked quizzically at Grimes, the spectacles making her look like a severe schoolmistress. "Commander Delamere did suggest that he assume temporary command of my ship during the operation, but I decided not to avail myself of his kind offer."

She's shrewd, thought Grimes. *She's got him weighed up.*

She turned again to Billinger. "*You* are the master, Captain. I am paying you a handsome salary. I expect you to begin earning it. And I am sure that Port Captain Grimes will be willing to oversee the entire operation from the ground end."

"I shall be pleased to, Your Excellency," said Grimes.

"After all," she told him, "this *is* your spaceport, even though it is normally used for archaic Australian rites. Thank you, gentlemen."

They were dismissed.

"I don't like it, John," said Mavis.

The Mayor of Paddington, the President of the Council of Mayors of Botany Bay, was sprawled in an easy chair in Grimes' sitting room, looking at him solemnly over the rim of a mug of beer. She was a big woman, big but firm-bodied, older than him but still sexually attractive. She was wearing a gaudy sarong that displayed her deeply tanned, sturdy legs and arms and shoulders. Her gleaming, almost white hair made a startling contrast to the darkness of her face, as did the pale gray eyes, the serious eyes. Of late she'd been too much the mother and too little the lover for Grimes' taste.

He said, "We have to get that bloody *Vega* off your cricket pitch sometime."

She said, "That's as maybe—but I wouldn't trust your cobber Delamere as far as I could throw him."

"No cobber of mine," said Grimes. "He never was, and never will be." He laughed. "Anyhow,

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you could throw him quite a fair way."

She laughed. "An' wouldn't I like to! Into one o' those stinkin' pools out at the sewage farm."

Grimes said, "He'd never dare to use his guns to demand that you turn me over to him. He knows damn well that if he sparked off an incident his Survey Service career would be blasted as surely as mine had been."

She did not need to be a telepath to sense his mood. She said softly, "That Service of yours has been more of a mistress—and a mother—to you than I have ever been, ever could be . . ."

"No . . ." he said at last.

"Don't lie to me, John. Don't worry about hurting my feelings. I'm just an old bag who's been around for so long that emotionally I'm mostly scar tissue . . ." She lit one of the cigars made from the mutated tobacco plants of Botany Bay, deeply inhaled the fragrant, aphrodisiac smoke. Grimes, whether or not he wanted to, got his share of the potent fumes. In his eyes she became more and more attractive, Junoesque. The sarong slipped to reveal her big, firm, brown-gleaming breasts. He got up from his own chair, took a step towards her.

But she hadn't finished talking. Raising a hand to fend him off she said, "And it's not only the Service. It's space itself. I've been through this sorta thing before. My late husband was a seaman—an' he thought more o' the sea an' his blasted ships than he ever did o' me. An' the airship skippers are as bad, their wives tell me. Sea, air an' space . . . The great mistresses with whom we mere, mortal women can never compete . . .

"You don't haveter tell me, John, but you're . . . pinin'. It's a space-goin' command you really want, not the captaincy of a cricket pitch that just happens ter be cluttered up with spaceships. I wish I could help—but it'll be years before we have any spaceships of our own. An' I wish I could get you off Botany Bay—for your sake, not mine; I hear things an' hear of things. That Delamere was sayin'—never mind who to—'The Survey Service has a long arm—an' if that bastard Grimes thinks he's safe here, he's got another thing comin' . . .'"

"Delamere . . ." said Grimes contemptuously.

"He's a weak man, perhaps," said Mavis, "but he's vain. An' cunning. An' dangerous."

"He couldn't fight his way out of a paper bag," said Grimes.

"He has men—an' he'll soon have a ship—to do his fightin' for him," Mavis told him.

"Let's forget about him, shall we?" suggested Grimes.

He dropped the last of his clothing to the floor, fell thankfully into Mavis' ample embrace. For a time—if only for a short time—he forgot space and ships and, even,

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the nagging premonition of some fresh disaster yet to come.

Grimes stood with Wheeldon on the close-cropped grass of the Oval—the groundsmen were still carrying out their duties although no one knew when, if ever, play would be resumed—a scant five meters from the recumbent hulk of *Vega*. She was no more than a huge metal tube, pointed at one end and with vanes at the other. It did not seem possible that she would ever fly, ever had flown. Like a giant submarine, improbably beached on grassland, she seemed—a submarine devoid of conning tower and control surfaces. Grimes remembered a visit he had paid to one of the shipbuilding yards on Atlantia, where he, and other Survey Service officers, had witnessed the launching of one of the big underseas oil tankers. And this operation, of which he was in charge, would be a launching of sorts . . .

Forward of the crippled destroyer stood *The Far Traveller*, a fragile-seeming golden tower, a gleaming spire supported by the flying buttresses that were her stern vanes. Between each of these there was a steel lug, the dull gray of the base metal contrasting with the rich, burnished yellow of the yacht's shell plating. Grimes had inspected these fittings and, reluctantly, had admitted that Delamere's artificers had made a good job. To each of the three lugs was shackled a length of wire rope, silvery metal cordage that, in spite of its apparent flimsiness, was certified to have a safe working load in the many thousands of tons. It, like the Baroness' yacht, was a product of Electra, whose metallurgists specialized in the rearrangement of molecular structures. It was hellishly expensive—but when it came to the supply of stores and equipment to its ships the Survey Service had its moments of profligacy. That wire must have been in *Vega's* storerooms for years. Nobody had dreamed that it would ever be used.

Lugs had been welded to the destroyer's skin just abaft the circular transparencies of the control room viewports. To each of these a length of wire was shackled. All three tow wires were still slack, and would be so until *The Far Traveller* took the strain. Grimes didn't like the setup. The problem would be to maintain an equal stress on all parts. He would have liked to have installed self-tensioning winches in either the yacht or the destroyer but, although such devices were in common use by Botany Bay's shipping, none available were capable of handling the enormous strains that would be inevitable in an operation of this kind. As it was, he must do his damnedest to ensure that at least two of the wires were taking the weight at all times, and that there were no kinks. He could visualize all too clearly what would

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happen if there were—a broken end whipping through the air with all the viciousness of a striking snake, decapitating—or worse—anybody unlucky enough to be in the way. And he, Grimes, would be one such. He had to direct things from a position where he could see at once if anything were going wrong. Delamere and the Baroness and all *Vega's* crew, with the exception of one engineer officer, were watching from the stands, from a safe distance. And Mavis, with her entourage, was also getting a grandstand view . . .

He stood there, hatless in the warm sunshine but wearing a headset with throat microphone. It was a good day for the job, he thought, almost windless. Nothing should go wrong. But if everything went right—there was that nagging premonition back again—then things could start going wrong. For him. *Heads you win, tails I lose . . . ?* Maybe.

He said to Wheeldon, "Better get up to the stands. If one of those wires parts it won't be healthy around here."

"Not on your sweet Nelly," said the Deputy Port Captain. "I'm supposed to be your apprentice. I want to see how this job is done."

"As you please," said Grimes. He spoke quietly, "Port Captain to *The Far Traveller.* Stand by to begin."

"Standing by," came Billinger's voice.

"Port Captain to *Vega.* Stand by."

"Standing by," replied the engineer in the destroyer's inertial drive room.

Ships, thought Grimes, *should be fitted with inertial drive units developing enough lateral thrust to cope with this sort of situation. But I'll use whatever thrust that engineer can give me . . .*

"Port Captain to *The Far Traveller.* Lift off . . ."

The yacht's inertial drive started up, cacophonous in the still air. She lifted slowly. The wire cables started to come clear of the grass.

"Hold her at that, Billinger. Hold her. Now . . . Cant her, cant her . . . Just five degrees short of the maximum safe angle . . ."

The Far Traveller was not only a floating tower, hanging twenty meters clear of the ground, but was becoming a leaning tower, toppling slowly and deliberately until her long axis was at an angle of forty degrees from the vertical. Billinger should have no trouble in holding her in that position. In a normal vessel anxious officers or petty officers would be sweating over their controls; in the fully automated yacht servo-mechanisms would be doing all the work.

"Port Captain to *Vega* . . . Maximum lateral thrust, directed *down* . . ."

The destroyer came to life, snarling, protesting. The racket from the two ships was deafening.

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"Lift her, Billinger, lift her . . . Maintain your angle . . ."

The Far Traveller lifted. The cables—or two of them—tautened. They . . . *thrummed*, an ominous note audible even above the hammering of the inertial drive units. But the sharp stem of *Vega* was coming clear of the grass, a patch of dead, crushed yellow showing in sharp contrast to the living green.

"Thirty-five degrees, Billinger directed . . ."

The change in the yacht's attitude was almost imperceptible, but the threatening song of the bar-taut wires was louder.

"Increase your thrust if you can, *Vega!*"

"I'll bugger the innie if I do that . . ."

"It's not *my* innie!" growled Grimes. *"Increase your thrust!"*

More yellow was showing under the ship.

"Billinger—thirty degrees . . . Twenty-five . . . And roll her, roll her to port . . . Just a touch . . . Hold it!"

For a moment it seemed that all the weight would be on one cable only, but now two had the strain once more.

"Twenty degrees, Billinger . . ."

Vega was lifting nicely, coming up from the long depression that she had made with her inert tonnage. Grimes noticed wormlike things squirming among the dead grass stems—but this was no time for the study of natural history. He was trying to estimate the angle made by the destroyer's long axis with the ground. Soon he would be able to tell the engineer to apply fore-and-aft thrust . . .

"Ten degrees, Billinger . . ."

Then it happened. One of the taut wires snapped, about halfway along its length. The broken ends whipped viciously—the upper one harmlessly but the lower one slashing down to the grass close to where Grimes was standing. It missed him. He hardly noticed it.

"Billinger, roll to starboard! Roll!" He had to get the weight back on to two wires instead of only one. "Hold her! And lift her, lift!"

Would the cables hold?

"*Vega*, fore-and-aft thrust! Now!"

The destroyer, her sharp bows pointing upwards and rising all the time, surged ahead. Two of her stern vanes gouged long, ugly furrows in the grass. There should have been an officer in her control room to take charge of her during these final stages of the operation—but Delamere, when this point had been raised, had insisted that this would not be necessary. (The obvious man for the job, of course, would have been *Vega's* commanding officer—and Frankie, as Grimes well knew, was always concerned for the safety of his own skin.)

Vega lifted, lifted, coming closer and closer to the vertical. Two of her vanes were already in contact

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with the ground, the third was almost so. Grimes looked up to the taut cables. He could see bright strands of wire protruding from one of them. It would be a matter of seconds only before it parted, as had the first one.

"*Vega!* Full lateral thrust! *Now*!"

"The innie's flat out!"

Damn all engineers! thought Grimes. At crucial moments their precious machinery was always of greater importance to them than the ship.

"Double maximum thrust—or you've had it!"

The officer must have realized that this was an emergency. The destroyer's inertial drive not only hammered, but . . . *howled.* The ship shuddered and teetered and then, suddenly, lifted her forward end, so rapidly that for an instant the cables hung slack. But Billinger quickly took the weight again and gave one last mighty jerk. The stranded cable parted but the remaining wire held. The broken end slashed down to the grass on the other side of the destroyer from Grimes.

Vega came to the perpendicular and stood there, rocking slightly on her vanes.

"Billinger—'vast towing! *Vega*—cut inertial drive!"

"It's cut itself . . ." said *Vega*'s engineer smugly.

And then, only then, was Grimes able to look down to see what the end of the first snapped cable had done. He stared, and swallowed, and vomited, where he stood, all over his shoes. But it didn't much matter. His footwear and lower legs were already bespattered with blood and tatters of flesh. The flying wire had cut the unfortunate Deputy Wheeldon—not very neatly—in two.

So Captain Billinger gingerly brought *The Far Traveller* down to a landing, careful not to get the yacht's stern foul of the two remaining tow wires. So Commander Delamere, at the head of his crew, his spacemen and marines, marched down from the grandstand and across the field and resumed possession of his ship. So the ambulance drove up to collect what was left of the Deputy Port Captain while Grimes stood there, staring down at the bloodied grass, retching miserably.

To him came Mavis, and Shirley and, surprisingly, the Baroness.

Mavis whispered, "It could have happened to you . . ."

Grimes said, "It should have happened to me, Mavis. I was in charge."

The Baroness said, "I shall arrange for more than adequate compensation to be paid to the Deputy Port Captain's relatives."

"Money!" flared Mavis. "It's all that you and your kind ever think of! If you hadn't grabbed the chance o' makin' a few dollars on the side by usin' your precious

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yacht as a tugboat this would never have happened!"

The Baroness said, "I'm sorry. Believe me, I'm sorry . . ."

"Look!" cried Shirley, pointing upwards.

They looked. Ports had opened along *Vega's* sleek sides, in the plating of turrets and sponsons. The snouts of weapons, cannon and laser projectors, protruded, hunting, like the questing antennae of some giant insect.

"Here it comes," said Mavis glumly. "The ultimatum. Give us Grimes, or else . . ." She stiffened. "But I'm not givin' you to those Terry bastards!"

Yet there was no ultimatum, no vastly amplified voice roaring over the sports arena. The guns ceased their restless motion but remained visible.

"Just Frankie making sure that everything's in working order," said Grimes at last.

"Leave him to play with his toys," said Mavis. "Come home and get cleaned up." She turned to the El Doradan. "Comin' with us, Baroness?" The tone of her voice made it obvious that she did not expect the invitation to be accepted.

"No, thank you, Your Ladyship. I must go aboard my yacht to see what must be done to make her spaceworthy again."

"C'm'on," said Mavis to Grimes and Shirley.

They walked slowly towards the main gates. All at once they were surrounded by a mob—men clad in white flannel with absurd little caps on their heads, with gaudily colored belts supporting their trousers, brandishing cricket bats.

"Terry bastard go home! Terry bastard go home!"

I've got no home to go to, thought Grimes.

"Bury the bastard in the holes he dug in our cricket pitch!" yelled somebody.

"Buryin's too good!" yelled somebody else. "Cut 'im in two, same as he did Skipper Wheeldon!"

"It was an accident!" shouted Mavis. "Now, away with yer! Let us through!"

"I'm chocker takin' orders from you, you fat cow!" growled a man who seemed to be the ringleader, a hairy, uncouth brute against whom Grimes, in any circumstances, would have taken an instant dislike. "An' as it's too long ter wait for the next election . . ."

He raised his bat.

From *Vega* came a heavy rattle of automatic fire. The sky between the ship and the mob was bright with tracers. Had the aim not been deliberately high there would have been sudden death on the ground. Again the guns fired, and again—and Grimes and the two women found themselves standing safe and unmolested while the cricketers bolted for cover. Three bats and a half dozen or so caps littered the

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heavily trampled grass.

"An' *now* what?" asked Mavis in a shaken voice.

"Just Frankie, as a good little Survey Service commander, rallying to the support of the civil authority," said Grimes at last. Then—"But where were *your* police?"

"That big, bearded bastard," muttered Mavis, "just happens to be a senior sergeant . . ."

Then Tanner, with a squad of uniformed men, arrived belatedly to escort the mayoral party to the palace. The City Constable was not as apologetic as he should have been.

The next day was a heavy one for Grimes.

There were, as yet, no Lloyd's Surveyors on Botany Bay; nonetheless *The Far Traveller* was required to have a fresh Certificate of Spaceworthiness issued to her before she could lift from the surface of the planet. Of course, the Baroness could depart without such documentation if she so wished—but without it her ship would not be covered by the underwriters. And she was, for all her title and somewhat decadent elegance, a shrewd businesswoman.

She called Grimes to her presence. A robot servitor ushered him into the lady's boudoir where she, flimsily dressed as usual, was seated at her beautiful, fragile seeming, pseudo-antique desk. She was wearing the heavy-rimmed spectacles again, studying a thick, important looking book.

"Ah, good morning, Acting Port Captain . . . Now, this matter of insurance. As you know, Commander Delamere's artificers were obliged to pierce my hull to fit the towing lugs. This morning they are making the damage good, as required by the contract. After the repairs have been completed a survey must be carried out."

"By whom, Your Excellency?" asked Grimes.

"By you, of course, Port Captain. You will receive the usual fee."

"But I'm not a surveyor . . ."

"You are the Port Captain." A slim index finger with a long, gold-enameled nail stabbed down at the open pages. "Listen. *On planets where Lloyd's maintain neither offices, agents nor surveyors Lloyd's Certificates may be endorsed or issued by such planetary officials as are deemed competent by the Corporation to carry out such functions. Port Captains, Port Engineers, etc . . . Commanding officers of vessels or bases of the Interstellar Federation's Survey Service . . .*" She smiled briefly. "I have no intention of paying a surveyor's fee to your friend Commander Delamere. In any case, as his people are doing the repairs he is ruled out." She read more. "*Commanding officers of vessels or bases of the Imperial Navy of Waverley . . .* No. I'm not going to wait around until that Waverley cruiser—*Robert Bruce*, isn't

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it?—condescends to drop in sometime. So . . ."

"So I'm it," said Grimes.

"Elegantly expressed, Acting Port Captain. But I suggest that you take Captain Billinger into consultation, and that both of you accept guidance from the computer. After all, it is the ship's brain. It is the ship—just as your intelligence is *you*—and is fully capable of self-diagnosis."

"Mphm," grunted Grimes. He wanted to pull his vile pipe out of his pocket, to fill it and light it, but knew that to ask permission to do so would bring a rebuff. He said, "So you need a Lloyd's Surveyor as much—or as little—as you need a Captain."

She said, "I need neither. But Lloyd's of London says that I must have both. So may I suggest that you get on with your surveying?"

Bitch, thought Grimes. *Rich bitch. Rich, spoiled bitch.* He said, "Very well, Your Excellency," bowed stiffly and left.

The humanoid robot in butler's livery led him to the elevator. The upward ride was such a short one that it would have been less trouble to have used the spiral staircase that ornately entwined the axial shaft. Billinger was waiting in his own quarters for Grimes.

The yachtmaster was not uncomfortably housed. The keynote was one of masculine luxury—deep armchairs upholstered in genuine black leather, a low, glass-topped coffee table standing on sturdy ebony legs, bookshelves all along one bulkhead, well-stocked with volumes in gilt and leather bindings, an ebony liquor cabinet, a huge playmaster encased in paneling of the same expensive wood. Holograms glowed on the other bulkheads, bright windows looking out on seascapes and mountainscapes and, inevitably, a beach scene on Arcadia with the inevitable sun-bronzed naked blonde in the foreground.

"She does you well, Captain," commented Grimes.

"Careful, Captain," said Billinger. "Big Brother—or Big Sister?—is watching. And listening." He gestured towards the playmaster, the screen of which seemed to be dead. "Coffee?"

"Please."

Almost immediately a girl, a stewardess, came in, bearing a tray—a golden tray, of course, with golden cream jug and sugar bowl, gold-chased china. And the girl—the robot, rather—was also golden, wearing a short-skirted black uniform over a perfectly proportioned body that gleamed metallically.

She set the tray on the table and poured. "Sugar, sir?" she asked. "Cream?"

The mechanical quality of her voice was barely discernible.

"Quite a work of art," remarked Grimes when she was gone.

"I'd sooner have something less good-looking in soft plastic," said

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Billinger coarsely. "But I've been making up for lost time on this world! Too bloody right—as the natives say—I have!"

"Big Sister . . ." murmured Grimes, looking meaningfully towards the playmaster.

"So what?" demanded Billinger belligerently. "I'm human. And it took humans to handle the raising of *Vega,* not the bastard offspring of an electronic calculator and a library bank!"

"The *first* time, Captain Billinger," said a cold, mechanical yet somehow feminine voice from the playmaster. "But should a set of similar circumstances arise in the future I shall be quite capable of handling operations myself."

"Big Sister?" asked Grimes.

"In person," growled Billinger. "Singing and dancing."

"For your information, gentlemen," went on the voice, "the artificers from the destroyer have commenced work upon my stern. I would have preferred to carry out the repairs with my own robots, but the owner maintained that Commander Delamere must adhere to the terms of the contract. Be assured, however, that I am keeping the artificers under close observation and will not tolerate any shoddy workmanship."

"Even so," said Grimes, "we had better go down to see what's happening."

"That will not be necessary, Acting Port Captain. I shall not lift from this planet unless I am completely satisfied as to my spaceworthiness."

"*I* shall be signing the certificate, not you," said Grimes harshly.

He drained his cup—he would have liked more of that excellent coffee but this uppity robot was spoiling his enjoyment of it—put it back on the table with a clatter, got to his feet.

"Are you coming, Billinger?" he asked.

"Yes," said the yachtmaster.

The two men made their way to the axial shaft, to the waiting elevator, and made a swift descent to the after airlock.

Vega's technicians were working under one of the destroyer's engineer lieutenants. This officer turned his head as Grimes and Billinger came down the ramp, straightened up reluctantly and accorded them a surly salute. He knew Grimes, of course, and like all of *Vega's* personnel blamed him for what had happened to that ship. He did not know Billinger, nor did he want to.

Grimes watched the artificers at work. Scaffolding had been erected under *The Far Traveller's* stern, a light but strong framework of aluminum rods and plates. Power cables snaked over the grass from the destroyer to the equipment in use. That seemed odd. Surely it would have been less trouble to use the output of the yacht's generators for the drilling, cutting and weld-

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ing. He said as much, addressing Billinger.

The engineer overheard. He said bitterly, "*She* would never allow it . . ."

"The Baroness?" asked Grimes.

"No. Not her. It's not her voice that's doing all the yapping. Some other female . . ." He raised his own voice an octave in not very convincing mimicry. " 'Why should *I* supply the power to repair the damage that *you* have done to me? Why should I wear out *my* generators . . .?' " He paused. "And that's not the worst of it. She hasn't actually come near us, but she must have spy eyes planted, and concealed speakers. Nag, nag, nag nag . . ."

The voice came from nowhere, everywhere. Grimes had heard it before, in Billinger's cabin. "Careful, you men. Careful. I'm not some dirty great battleship that you're patching up. I take some pride in *my* appearance, even if you take none in yours. I shall expect that scratch filled and then buffed to a mirror finish."

"Who the hell is she?" demanded the lieutenant.

"Big Sister," Billinger told him, his voice smug and almost happy.

"She sounds more like some wives I've heard."

"Not mine," said Billinger. "Not mine. Not that I've ever had one. And when I do she'll not be like that."

"They never are," said the other philosophically, "until after you've married them . . ."

"Captain Billinger, may I suggest that you abandon this futile conversation and take some interest in the repairs? And Mr. Verity, please supervise the activities of those ham-handed apes of yours. I distinctly said that each plug must be machined to a tolerance of one micro-millimeter or less. I will *not* accept ugly cracks filled in with clumsy welding."

"It's all very well," said the engineer hotly, "but we don't have a supply of that fancy gold your ship is made of. We could use ordinary gold—but you say that that won't do."

"And what happened to the metal your men drilled out?"

"There were losses. There are always losses."

And how many of Vega's *mechanics,* wondered Grimes, *will be giving pretty little trinkets to their girlfriends back on Lindisfarne?*

"Very well," said *The Far Traveller's* voice, "I shall supply you with gold. Please wait at the foot of the ramp."

The men waited. A female figure appeared in the after airlock chamber then walked gracefully down the gangway. It was Billinger's robot stewardess. The artificers whistled until, suddenly, they realized that she was not human. But one of them muttered, "Be a bleedin' shame to melt *her* down . . ."

She was carrying a golden tray,

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and on it a teapot of the same metal, a milk jug and a sugar bowl. Wordlessly she handed these to one of the spacemen.

"*My* tea service!" exclaimed Billinger.

"Nothing aboard me is yours, Captain," said Big Sister. "As long as you are employed you have the use of certain equipment."

"What *is* all this?" asked the engineer.

"Just do as *she* says," muttered Billinger. "Melt down my teapot and make it snappy. Otherwise she'll be having the buttons and braid off my uniform . . ."

Grimes wandered away. The atmosphere around the stern of the yacht was becoming heavily charged with acrimony and he was, essentially, a man of peace. He carefully did not walk too close to the towering *Vega*. He had no reason to like that ship and certainly her captain did not like him. He sensed that he was being watched. He looked up but saw nothing but the reflection of the morning sun from the control room view ports—but he could imagine Delamere there, observing his every move through high-powered binoculars.

"Port Captain! Hey, Port Captain!"

Grimes sighed. There was a group of pestilential cricketers under the destroyer's quarter. What were the police doing? They were supposed to be keeping the field clear of demonstrators. But these men, he saw with some relief, were carrying neither bats nor placards, although they were clad in the inevitable white and were wearing the absurd little caps on their heads. He walked slowly to where they were standing.

"Wotcher doin' about this, Port Captain?" asked their leader. It was the man whom Mavis had identified as a police sergeant.

This was the two deep furrows that had been gouged in the turf by the stern vanes of the destroyer during the lifting operation.

Grimes looked at the ugly wounds in the skin of the planet. They were minor ravines rather than mere trenches. The sportsmen looked at him.

He said, "These will have to be filled . . ."

"Who by, Port Captain? Tell us that."

"The official groundsmen, I suppose . . ."

"Not bloody likely. You Terries did it. You can bloody well undo it. An' the sooner the better."

"The sooner they're off this world the better," growled one of the other men.

"Mphm," grunted Grimes. He was beginning to think that the sooner he was off this world the better. He was the outsider who, by his coming, had jolted Botany Bay out of its comfortable rut. He had friends, good friends, the Mayor and those in her immediate entourage—and that was resented. This

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same resentment might well cost Mavis the next election.

"Wotcher doin' about it?" demanded again the bearded policeman.

"I'll see Commander Delamere," promised Grimes, "and ask him to put his crew to work filling these . . . holes."

"*Ask* him, Port Captain? You'll bloody tell him."

"All right," said Grimes. "I'll tell him."

He turned, walked away from the glowering men. He paused briefly at the foot of *Vega's* ramp, looked up at the smartly uniformed Marine on gangway duty in the airlock. The man looked down at him. His expression was hostile. *I'd better not go aboard that ship,* thought Grimes. *I'll call* Vega *from my office.* He carried on to the grandstand, made his way up the steps to what was grandiosely labeled SPACEPORT ADMINISTRATION.

He accepted the cup of tea that Shirley poured for him, went to the telephone, punched the number that had been alloted to *Vega.* The screen lit up and the face of a bored looking junior officer appeared. "FSS *Vega.*"

"Port Captain here. Could I speak to Commander Delamere?"

"I'll put you through to the control room, sir."

The screen flickered, went blank, lit up again. Delamere's face looked out from it. "Yes, Grimes? What do you want? Make it snappy; I'm busy."

"The local cricket club is concerned about the damage to their field."

"And what am *I* supposed to do about it?"

"Send some men down with shovels to fill the holes *your* stern vanes cut in the turf."

"My men are spacemen, not gardeners."

"Even so, the damage has to be made good, Delamere."

"Not by me it won't be, Grimes. You're supposed to be the Port Captain and this bloody Oval is supposed to be a spaceport. Its maintenance is *your* concern, not mine."

"Maintaining friendly relations with the natives of any world is the concern of any Survey Service Commanding Officer. And you can do just that by sending your crew down to fill those holes."

"*You* did that damage Grimes, by your mishandling of the raising. If it's beneath your dignity to take a shovel in your own hands I suggest that you ask your new girlfriend to lend you a few of her robots."

"My new girlfriend? I thought she . . ."

Delamere scowled. "Then think again! You're welcome to her, Grimes!"

The screen went blank.

Grimes found himself laughing. So at last there was a woman who

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was impervious to Delamere's charm. And Delamere, being Delamere, would automatically blame Grimes for his lack of success. Meanwhile, what was the legal situation regarding the damage to the turf?

Grimes stopped laughing. It looked very much as though he would be left alone holding the baby.

So the day went, a long succession of annoyances and frustrations. He succeeded in obtaining another audience with the Baroness—his new girlfriend, indeed!—and requested her assistance to fill the trenches. She refused. "My dear Port Captain, my robots are programmed to be personal servants and, to a very limited degree, spacemen, not laborers. Would you use your toothbrush to . . . scrub a deck?"

If it were the only tool available, thought Grimes, he might have to do just that.

He returned to his office, called Mavis. She was short with him. She said, "I know I'm the Mayor, John, but the damage to the cricket pitch is your responsibility. You'll just have to do the best you can."

Finally he went back to *The Far Traveller*. The work had been completed but he thought that he had better go through the motions of being a surveyor, even though it was almost impossible to see where the golden hull had been patched, even though Big Sister had expressed her grudging satisfaction. He told the engineer lieutenant not to dismantle the staging until he had completed his inspection. He tapped all around the repair work with a borrowed hammer, not at all sure what he was looking or listening for. He told the engineer to send to the destroyer for a can of vactest and to have the black, viscous paste smeared over where the plugs had been inserted. Big Sister complained (she would) saying that this was not necessary, that she was quite happy with the making good of the damage and that she objected to having this filthy muck spread over her skin. Grimes said that *he* would be signing the certificate and that he would not do so until *he* was happy.

Sulkily, Big Sister pressurized the after compartment. Not the smallest air bubble marred the gleaming skin of vactest. The artificers cleaned the gummy mess off the shell plating, began to take down the scaffolding. Grimes went aboard the ship to endorse the Lloyd's Certificate of Spaceworthiness. The Baroness was almost affable, asking him to have a drink. Billinger was conspicuous by his absence.

She said, looking at him over the rim of her glass of Spumante, "This is a boring world, Captain Grimes. I know that Captain Billinger does not find it so, but there is nothing for me here."

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Grimes could not resist the temptation. "Not even Commander Delamere?" he asked.

Surprisingly she took no offense. She even laughed. "Commander Delamere may think that he is God's own gift to womankind, but I do not share that opinion. But you, Captain . . . You, with your background . . . Don't you find Botany Bay just a little boring?"

"No," said Grimes loyally. (The Baroness must surely know about Mavis and himself.) "No . . ." he repeated after a pause. (And whom was he trying to convince?)

"Thank you, Port Captain," said the Baroness. It was clearly a dismissal.

"Thank you, Your Excellency," said Grimes.

He was escorted from the boudoir by the robot butler, taken down to the after airlock. It was already dusk, he noted. The sun was down and the sky was overcast but the breeze, what little there was of it, was pleasantly warm. He debated with himself whether or not to go up to his office to call a cab, then decided against it. It was a pleasant walk from the Oval to the mayor's palace, most of it through the winding streets of Paddington City that, by night especially, held a special glamour, a gaslit magic that was an evocation of that other Paddington, the deliberately archaic colony in the heart of bustling, sprawling Sydney on distant Earth.

Somehow Grimes wanted to see it all once more, to savor it. Perhaps it was a premonition, but there was the conviction that sooner or later, sooner rather than later, he would be moving on.

He walked across the short grass to the main gates of the Oval. He turned to look at the two ships, both of them now floodlit—the somehow menacing metal tower that was the destroyer, a missile of dull steel aimed at the dark sky, the much smaller golden spire—slender, graceful—that was the yacht. They would be gone soon, both of them—Delamere's engineers must, by now, have *Vega's* main and auxiliary machinery back in full working order and the Baroness had intimated that she had found little to interest her on Botany Bay.

They would be gone soon—and Grimes found himself wishing that he were going with them. But that was out of the question. Aboard *Vega* he would be hauled back to Lindisfarne Base to face a court martial, and he could not visualize himself aboard *The Far Traveller*, with her rich bitch owner and that obnoxious electronic intelligence which Billinger had so aptly named Big Sister.

He resumed his walk, pausing once to stare up at a big dirigible that sailed overhead, coming in to the airport, its red and green navigation lights and its rows of cabin lights bright against the darkness.

He strolled along Jersey Road,

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admiring the rows of terrace houses with their beautiful cast aluminum lacework ornamenting pillars and balconies, the verdant explosions of native shrubs, dark behind intricate white metal railings, in the front gardens. He ignored the ground car—even though this was the only traffic he had seen since leaving the spaceport—that came up slowly from behind him, its headlights throwing a long shadow before him on to the footpath.

He heard a voice say, "There's the bastard! Get him!"

He felt excruciating but mercifully brief pain as the paralyzing beam of a stungun hit him and was unconscious before he had finished falling to the ground.

He opened his eyes slowly, shut them again hastily. He was lying on his back, he realized, on some hard surface, staring directly into a bright, harsh light.

He heard a vaguely familiar voice say, "He's coming round now, sir."

He heard a too familiar voice reply, "Just as well, Doctor. They'll want him alive back at Base so they can crucify him."

Commander Delamere, and his ship's surgeon . . .

He moved his head so that he would not be looking directly at the light, opened his eyes again. Delamere's face swam into view. The man was gloating.

"Welcome aboard, Grimes," he said. "But this is not—for *you*—Liberty Hall. There's no mat to spit on and if you call my ship's cat a bastard I'll put you on bread and water for the entire passage."

Grimes eased himself to a sitting posture, looked around. He was in a small compartment which, obviously, was not the ship's brig, being utterly bare of furniture. A storeroom? What did it matter? Delamere and the doctor were looking down at him. Behind them stood two Marines, their side arms drawn and ready.

He demanded, "What the hell do you think you're playing at? Kidnapping is a crime on any planet, and I'll see that you pay the penalty."

"Kidnapping, Grimes? You're still a Terran citizen, and this ship is Terran territory. Furthermore, your arrest was carried out with the assistance of certain local police officers." He smirked. "Mind you, I doubt if Her Ladyship the Mayor would approve—but she'll be told that you were last seen going down to the beach for a refreshing swim after a hard day at the spaceport." He laughed. "You might think that you're the little friend to all the universe, but there are plenty of people who hate your guts."

"And you're one of them," said Grimes resignedly.

"However did you guess?" asked Delamere sardonically.

"I must be psychic," Grimes said.

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"Save your cheap humor for the court martial, Grimes."

"If there is one, Delamere. *If* you get me back to Lindisfarne. But the Mayor will know that I'm missing. She'll have this ship searched . . ."

Delamere laughed. "Her policemen have already boarded. They weren't very interested. We showed them through all the accommodations, including the cells. They did see a couple of storerooms—but not, of course, this one. Even if they had got as far as the outer door the radiation warning sign would have kept them out."

"Is this place hot?" asked Grimes, suddenly apprehensive.

"You'll find out soon enough," said Delamere.

But Handsome Frankie, thought Grimes with relief, would never risk his own precious skin and gonads in a radioactive environment.

Delamere looked at his watch. "I shall be lifting off in a half hour. It's a pity that I have not been able to obtain the necessary clearance from the Acting Port Captain, but in the circumstances . . ."

Grimes said nothing. There was nothing that he could say. He would not plead even if there were the remotest chance that Delamere would listen to him. He would save his breath for the court martial. He would need it then.

But what was that muffled noise coming from the alleyway outside the storeroom? Shouting, a hoarse scream, the sound of heavy blows . . . Could it be . . ? Could it be the police attempting a rescue? Or—and this would be a beautiful irony—yet another mutiny, this one aboard *Vega*?

He remarked sweetly, "Sounds as though you're having trouble, Frankie."

Delamere snapped to the Marines, "You, Petty and Slim! Go out and tell those men to pipe down!"

"But the prisoner, sir," objected one of them.

Grimes watched indecision battling with half-decisions on Delamere's face. The commander had no desire to walk out into the middle of a free fight, but he had to find out what was happening. On the other hand, he had no desire to be left alone with Grimes, even though his prisoner was unarmed and not yet recovered from the stungun blast.

There was a brief rattle of small arms fire, another hoarse scream. The Marines hastily checked their pistols—stunguns, as it happened—but seemed in no greater a hurry to go out than Delamere himself.

And then the door bulged inward—bulged until the plating ruptured, until a vertical, jagged-edged split appeared. Two slim, golden hands inserted themselves into the opening, took a grip and pulled apart from each other. The tortured metal screamed, so loudly as al-

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most to drown the crackling discharges from the Marines' stunguns.

A woman stepped through the ragged gap, a gleaming, golden woman clad in a skimpy, ship stewardess' uniform. She stretched a long, shapely arm, took the weapon from the unresisting hand of one of the Marines, squeezed. A lump of twisted, useless metal dropped with a clatter to the deck, emitted a final coruscation of sparks and a brief acridity of blue fumes. The other Marine went on firing at her, then threw the useless stungun into her face. She brushed it aside before it reached its target as though she were swatting a fly.

Another woman followed her, this one clad as a lady's maid—black-stockinged, short-skirted, with white frilly apron and white frilly cap. She could have been a twin to the first one. Perhaps she was—they came from the same robot factory on Electra.

Delamere was remarkably quick on the uptake. "Piracy!" he yelled. "Action stations! Repel boarders!"

"You've two of them right here," said Grimes happily. "Why don't you start repelling them?"

The stewardess spoke. Her voice was the cold voice of Big Sister. She said, "Commander Delamere, you have illegally brought Port Captain Grimes aboard your vessel and are illegally detaining him. I demand that he be released at once."

"And I demand that you get off my ship!" blustered Delamere. He was frightened and making a futile noise to hide the fact.

The stewardess brushed Delamere aside, with such force that he fetched up against the bulkhead with a bone-shaking thud. She reached down, gripped Grimes' shoulder and jerked him to his feet. He did not think that his collarbone was broken but couldn't be sure.

"Come," she said. "Or shall I carry you?"

"I'll walk," said Grimes hastily.

"Grimes!" shouted Delamere. "You're making things worse for yourself! Aiding and abetting pirates!" Then, to the Marines, "Grab him!"

They tried to obey the order but without enthusiasm. The lady's maid just pushed them, one hand to each of them, and they fell to the deck.

"Doctor," ordered Delamere, "Stop them!"

"I'm a noncombatant, Captain," said the medical officer.

There were more of the robots in the alleyway, a half dozen of them, male but sexless, naked, brightly golden. They formed up around Grimes and his two rescuers, marched towards the axial shaft. The deck trembled under the impact of their heavy, metal feet. And there were injured men in the alleyway, some unconscious, some groaning and stirring feebly. There

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was blood underfoot and spattered on the bulkheads. There were broken weapons that the automata kicked contemptuously aside.

Somebody was firing from a safe distance—not a laser weapon but some large caliber projectile pistol. (Whoever it was had more sense than to burn holes through his own ship from the inside—or, perhaps, had just grabbed the first firearm available.) Bullets richocheted from bulkheads and deckhead, whistled through the air. There was the *spang* of impact—metal on metal—as one hit the stewardess on the nape of her neck. She neither staggered nor faltered and there was not so much as a dent to mark the place.

They pressed on, with Grimes' feet hardly touching the deck as he was supported by the two robot women. There was an officer ahead of them, guarding the access to the spiral staircase that would take them down to the after airlock. Holding a heavy pistol in both hands he pumped shot after shot at the raiders and then, suddenly realizing the futility of it, turned and ran.

Down the stairway they clattered. The inner door of the airlock was closed. The two leading robots just leaned on it and it burst open. The outer door was closed, and required the combined strength of three of the mechanical men to force it. The ramp had been retracted and it was all of ten meters from the airlock to the ground. Two by two the robots jumped, sinking calf-deep into the turf as they landed.

"Jump!" ordered the stewardess who, with the lady's maid, had remained with Grimes.

He hesitated. It was a long way down and he could break an ankle, or worse.

"Jump!" she repeated.

Still he hesitated.

He cried out in protest as she picked him up, cradled him briefly in her incredibly strong arms, then tossed him gently outward. He fell helplessly and then six pairs of hands caught him, cushioned the impact, lowered him to the ground. He saw the two female robots jump, their short skirts flaring upward to waist height. He remembered, irrelevantly, Captain Billinger's expressed preference for something in soft plastic rather than hard metal . . .

They marched across the field to *The Far Traveller.* Somebody in *Vega's* control room—Delamere?—had gotten his paws on to the firing console of the destroyer's main armament. Somebody, heedless of the consequences, was running amok with a laser cannon—somebody, fortunately, who would find it hard to hit the side of a barn even if he were inside it.

Well to the right a circle of damp grass exploded into steam and incandescence—and then the beam slashed ahead of them. Per-

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haps it was not poor shooting but a warning shot across the bows. The lady's maid reached into a pocket of her apron, pulled out a small cylinder, held it well above her head. It hissed loudly, emitting a cloud of dense white smoke. The vapor glowed as the laser beam impinged upon it and under the vaporous umbrella the air was suddenly unbearably—but not lethally—hot. And then the induced fluorescence blinked off. They were too close to the yacht, and even Delamere—or especially Delamere—would realize the far-reaching consequences if a vessel belonging to a citizen of El Dorado were fired upon by an Interstellar Federation's warship.

They tramped up the golden ramp, into the after airlock. Supported by the two female robots Grimes was taken to the Baroness' boudoir. She was waiting for him there, together with Mavis, Shirley, Jock Tanner and Captain Billinger. The yachtmaster was not in uniform.

"You have to leave us, John," said Mavis regretfully.

"But . . ." objected Grimes over the cold drink that had been thrust into his hand by the Mayor.

"I can't guarantee your safety," she said.

"Neither can I," said Tanner. He grinned rather unpleasantly. "And Mavis, here, has to think about the next elections."

"Your Excellency," said the robot butler, entering the room, "There is a Commander Delamere at the after airlock, with a party of armed men. I refused him admission, of course."

"Of course. And if he refuses to leave see to it that the general purpose robots escort him back to his own ship."

"Very good, Your Excellency."

The Baroness looked at Grimes. She said, "You are very lucky. The ship's brain—the entity referred to by Captain Billinger as Big Sister—saw you being taken aboard Commander Delamere's vessel. So, when Her Ladyship here appealed to me for aid I decided to give it. After all, we on El Dorado—or some of us—feel that we are obliged to you."

"Your Excellency . . ." It was the robot butler back . . . "Commander Delamere claims that our gp robots did considerable damage to his vessel."

"The gp robots?" murmured Grimes. "And that pair of brass Amazons."

"*Golden* Amazons," the Baroness corrected him coldly. Then, to the servitor, "Tell Commander Delamere he may sue if he wishes—but that I shall bring a counter-suit. He fired upon valuable property—six gp robots and two specialist robots—both with small arms and with a laser cannon. He should consider himself fortunate that no extensive damage was done to the

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expensive automatons."

What about damage to me? Grimes asked himself.

"See to it that we are not disturbed again," said the Baroness to the butler. "And now, Acting Port Captain Grimes . . . What are we to do with you? Her Ladyship asked me to give you passage off Botany Bay—but *The Far Traveller* has no accommodation for passengers. However . . . It so happens that Captain Billinger has resigned, and that I have accepted his resignation . . ." Billinger looked quite happy. "And, although the post is a sinecure, Lloyd's of London insists that I must carry a human master on the Register. As Acting Chief of Customs the City Constable will enter your name on the document."

"I've already done so," said Tanner.

"You know where the master's quarters are," said Billinger. "I've already cleared my gear out. Sorry that there's no time for a proper hand-over, but the ship herself—Big Sister—will tell you all that you need to know about her."

"I'm sorry, John," said Mavis. "Really sorry. But you can't stay here. And this is the best way for you. You'll be far happier back in space."

Shall I? wondered Grimes. *In this ship?*

She got to her feet. Grimes rose to his. She put out her arms and pulled him to her, kissed him, long and warmly. But there was something missing. Tanner escorted her to the door, turning briefly to give an offhand wave. *Mayor and City Constable*, thought Grimes. *A rather obvious combination.*

"Good-bye, John," said Shirley. She, too, kissed him. "Don't worry about Mavis. She'll make out—and Jock Tanner's moving back in." She laughed, but not maliciously. "If you're ever back on Botany Bay, look *me* up."

And then she was gone.

"Very touching," said the Baroness. And was that a faint note of envy in her voice?

"Good-bye, Your Excellency," said Billinger. "It has been a pleasure . . ."

"Don't lie to me, Captain."

"Good-bye, Captain Grimes. Do as Big Sister says and you'll not go wrong."

"Good-bye, Captain Billinger."

Grimes nursed his drink. He heard Big Sister say—stating a fact and not giving an order—"All visitors ashore."

"Well, Captain," asked the Baroness, "aren't you going up to your control room?"

"The control room? But . . ."

He realized suddenly that the inertial drive was in operation, that the ship was lifting. Almost in panic he got to his feet.

"Do not worry," said the Baroness. "She has her orders. She will manage quite well without you.

What have I gotten myself into now? Grimes wondered. ■

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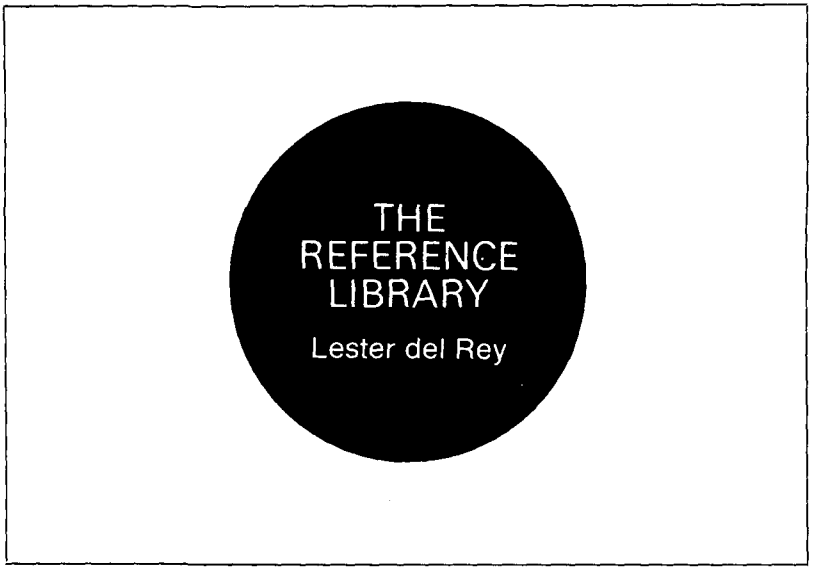

INTO THE MAINSTREAM. HURRAH . . . ?

There seem to be a lot of science fiction writers who are obsessed by a peculiar neurosis—they desperately want to be accepted into the mainstream, and yet they never sit down and write a mainstream novel. Apparently, they're secretly afraid to try. A number of them recently have been clamoring to "get out of the ghetto" by the simple expedient of having the science fiction label left off their book. They hope thereby, I assume, to have the booksellers place their books on the main racks where general fiction is sold.

Publishers stubbornly refuse to give in to their desires, because any publisher worth his salary knows a few things about the market. In the first place, the average science fiction novel sells more copies and makes more money than the average novel. That really happens to be true; a few general fiction books make a great deal of money, but many more are failures in the market. In the second place, any honest cover blurb would automatically turn off the general reader; the one who will read science fiction has bypassed the general section and gone to the science fiction shelves. And finally, it's a foolish publisher or author who tries to deceive a bookseller!

Still, there's nothing wrong with writing general fiction. In fact, one of the novels of mine which I consider my best had no hint of science fiction or fantasy in it. Maybe a writer should get away from science fiction once in a while. And writing general fiction isn't all that difficult. All it requires is a reasonably good idea, a set of interesting characters, and the basic ability to write decently; but just as

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in trying to write science fiction, the writer should familiarize himself with what he wants to do by reading a lot of the material in the field and seeing how it is done. (That is the step which most category writers neglect when they try to write mainstream fiction.)

Also, of course, there's nothing wrong with a mainstream writer trying to write science fiction, provided he takes the trouble to know what he is doing and is willing to write honestly. Too many in the past have tried condescending to a lucrative science fiction market for which they felt contempt, and the results have been pretty sad.

Today, there are a few signs that some very successful authors are thinking seriously about introducing at least some elements of science fiction into their work. And when they succeed, it might be well worthwhile for writers—and perhaps readers—to take a good look at what they do and compare it with what the regular science fiction writers do. Maybe they know something about the mainstream—and story-telling in general—that we don't.

One highly successful writer has recently done such a book, which is currently on the bestseller lists. This is **The Boys from Brazil** by Ira Levin (Random House, $8.95, 312 pp.). Levin is, of course, the writer who previously proved that it was possible to make an honest, straight fantasy novel become a best-seller; his *Rosemary's Baby* was a book I enjoyed and which my neighbors shuddered over happily, despite the fact that they would never read fantasy. He's an extremely skillful writer—so skillful, indeed, that the movie script for that previous book was almost directly lifted from the book, needing no changes except for a few scenes.

The current book uses one science fiction device, which is completely central to the whole novel. Without that, nothing could happen. Hence, in my view, it has to be considered science fiction. This device is only vaguely hinted at through the first half of the book. (And for those who haven't read the book, I don't intend to reveal it, though science fiction readers should spot the general idea fairly quickly. It was given away in a major book review, either from ignorance or spite, but the book deserves reading as the author meant.)

It's obviously concerned with a group who are still nurturing the idea of returning someone like Hitler to power—a group of dedicated Nazis, with their headquarters in Brazil. From there, we see agents being sent out to murder ninety-four aging, insignificant men across the world. A famous Nazi hunter, Yakov Liebermann, learns of the activity, but cannot understand what is behind it. And the story concerns itself with his discovery and what he is forced to do.

It's absolutely first-rate suspense reading. Curiously, by the time the "secret" is revealed completely, there is no letdown to the story. Rather, the reader is so caught up by then that the suspense heightens from that point on. Nobody is ever going to call this a great classic of

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literature—it wasn't meant to be. But it is a damned fine story!

So what are the tricks that make it work? None, I'm afraid, that should not be at the command of any writer for any field, except for the fact that it takes place here and now—which is always the best time and place for a novel to appeal to the general reader. (And quite a few good straight science fiction novels have also taken place here and now, so that's no difficulty.)

The great virtue of the book is its careful, precise structure. It uses one sf device, and makes the maximum use of that. This is first indicated by some of the characters; then a hint is given in a beautiful scene at a laboratory—one which is abandoned, since its work is finished. The nature of the work is suggested, but there are no fancy machines running, no elaborate glassware, only enough to show the time and effort involved. Then the device is revealed, and its results. The maximum effect is achieved with the minimum amount of assumption; and aside from the basic single assumption, no further gadgetry or needless sf color is added. Everything is shown through a careful selection of appropriate characters. As in the world of reality, everything doesn't go precisely as expected, but nothing that happens ever seems like coincidence or something just added to aid the plot. The work is clean and direct.

In other words, the author has done his work for the reader, as he should!

Now let's look at a current science fiction novel. I've deliberately chosen one that is quite different—yet not atypical. It's a book I enjoyed reading, by an author whose writing ability I generally admire. This is **Where Late the Sweet Birds Sang** by Kate Wilhelm (Harper & Row, $7.95, 251 pp.).

It's the story of the coming collapse of our society. A group of related families centered around a valley of pleasant farms realizes that the disaster may leave no humans alive. There are already signs that human fertility is declining. They prepare for the days ahead by building a hospital-laboratory where they can clone themselves. And, indeed, the disaster hits, and no humans remain fertile. Life is left to the clones. These clones, incidentally, were planned in such a way that the planners hoped by the third generation they would be able to regain fertility and breed normally. They do regain fertility, but choose to continue cloning as well as normal reproduction.

And the clones are different from their "parents." They work as groups, intolerant of the normal humans who started them. The first section (previously a novelette) deals with David Sumner, one of the original family, who is forced aside by the new clones. The second section deals with Molly, one member of a clone family, who is forced to become independent; and the third deals with Mark, her son raised outside the colony for five years, who is trying to restore humanity to its original independent state.

Okay, we've got cloning as our

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main assumption. And we've got a minor assumption to go with that—that all clones (at least in the first section) have some degree of mutual awareness, a kind of limited telepathy. But there are also a number of other background assumptions. We have social breakdown, plagues and human and animal sterility all tossed at us as mere background in the first thirty pages or so. We'll accept the breakdown. But the plagues and sterility are thrown at us much too casually. What happens in the outside world when everyone is sterile? All hell would break out, but we never see that. Nor do we see the reaction of the people in the valley—and some would react strongly. This isn't happening to people here—it's happening to a story!

There's too much carry-over from past science fiction, too, a risk that afflicts most writers in the field. We've assumed that clones might have telepathy—so these clones do, of a sort. But why should clones of unlike parentage (at least in Part I) have any link? And why should the clones *all* act somehow like the children in *The Midwich Cuckoos?* Surely some would have felt some bond to their elders. Dramatically, it would have been better so.

Those plagues come only once, killing at least sixty percent of the population at large (and thirty percent in the valley) and then mysteriously vanish. That's fine for the plot—but surely some of the clones would not have been immune. At least they might worry about it. But the use of the plague is done in the story, so the plague vanishes.

Later, when some clones are fertile, the women are put into breeding houses under sedation, etc.—you've seen that device in other science fiction. But why this assumption? These people are highly empathic. They should consider leaving the breeding females among their family groups, where they could breed just as well—and more economically—than in segregation.

And finally, we get a return of the Ice Age to the country. Okay, the end of pollution is used as some explanation. But back in 1650, when there was no pollution, the climate was not at all bad. Why should this happen—except to give added color to the story?

Wilhelm's writing is also clean and good. But her characters suffer from the fact that the book is broken into three parts, each with a different central character and a great many minor ones. Just when we get used to one, we have to shift to another. This seems necessary to the book, but it would prove a serious disadvantage to the general reader. And generally, I think it's an unfortunate writing device. It's particularly bad when each central character is thrown away completely before we begin to follow the next. Once David and Molly finish their sections, they are gone for good. The emotional impact would have been much stronger if they could have remained as the next character took over.

There's too much needless complexity of assumption—one minor

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one following another, and most of them inadequately justified. I don't think the old rule of only one major assumption per story is absolutely valid; but I do recommend sticking as close to it as possible. And there are too many science fiction bits here where they are not needed. It's a habit easy to get into for those of us who read and write a lot of science fiction. But it's a careless habit. Nothing should be in a story which is not needed.

The novel is not at all a bad one. As I said, I enjoyed it. But even the title is needlessly fussy. Compare it with Levin's very appropriate and direct title! For science fiction readers, it's probably a satisfactory novel. But even if the publisher had tried removing the sf label and putting it into the general racks it couldn't be turned into a general book.

To some extent, science fiction is something of an inside game, with those on the inside knowing the references and the rules, and often gaining half our delight at seeing them turned topsy-turvy or bent. But don't wish that on the outside groups who don't automatically assume that having robots change their brains for the job or giving telepathy to clones is the accepted thing, to be taken casually.

We've become far *too* casual about our wonders, and we've gotten into a lot of very bad dramatic habits of construction. In the big cruel world beyond science fiction, those don't go. We take far too much for granted—and frequently, within the readership of science fiction, that is proper and saves needless repetition. But it isn't very good writing.

The late James Blish was once surprised to discover that his "Surface Tension" was his most popular story. But being a highly analytical man, he set about finding out why it was so. And he discovered what he and the rest of us should have known all along.

In that story, he decided to pretend that no writer had ever before written about a world inside a drop of water. He tried taking the basic idea from a fresh start, examining every aspect of it, accepting no assumption that had been made previously, and seeing what might happen if a tiny pond was a full world of its own people and culture.

And that's the way every good story should be written. The author should step away from everything previously done—not forgetting, but not automatically accepting—and then determine the maximum that can be done with his assumption. He should also prune out vigorously anything that does not directly serve his story in some manner. And, of course, he should realize that his result must be viewed through the minds of interesting characters.

Ira Levin does that. It's his only secret. And it is still a secret that must be learned by science fiction writers who want to be sold in the mainstream. It's the way to write good general fiction.

It's also an excellent way to write good science fiction for the science fiction reader. ■

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EDITORIAL *continued from page 9*
a door opens unexpectedly, no airborne micro-organisms will escape.

P4 is straight out of *The Andromeda Strain,* with airlocks, protective suits, clothing changes and showers when leaving the laboratory. Some scientists have voiced doubts that a complete P4 setup could be maintained on a university campus.

There are three levels of biological containment, EK1–EK3, which stipulate what types of bacteria can be used in the experiments. In EK1, the K-12 strain of *E. coli* is specified. This strain is generally believed to be unable to survive in the human body, although a few biologists doubt this belief.

EK2 calls for using K-12 strains that have been genetically weakened so that, on the average, only one out of 100 million bacteria would be expected to survive outside the laboratory. EK3 is the same as EK2 except that the weakened bacteria are fed to laboratory animals as a check to see if any mutations survive.

Like most compromises, the NIH rules really satisfy practically nobody. Some biologists think they are too strict, and will ensure more governmental interference and red tape than they are worth. Others see the rules as too lax.

The rules have not been formally adopted by NIH, so there is still room for adjustment and time for politicking about them. But in a very real sense, the molecular biologists are in a race against time. And so is the whole human race.

How long can this self-imposed moratorium be maintained? The molecular biologists have been marking time for more than two years now. They have been working on the background technology and sharpening their techniques by working on "safe" organisms. But this is like playing exhibition baseball games during spring training; it's a preparation for the real thing, but not the real thing itself.

Meanwhile, research on cloning bacteria is moving ahead, and the first solid promise of medicines that directly attack viruses is being reported from still other laboratories.

In today's electronic world, there is no way for basic research to be free of almost immediate political impact. The question is, who makes the political decisions about research, and when? Do we leave it up to the scientists to police themselves? Or the politicians? Do we stop lines of research that seem to have dangerous consequences? If so, maybe Robert Brown's work would have been stopped because it led to our present situation.

If you think that the decisions to develop nuclear weapons were agonizing, and the current debate on nuclear energy is excruciating, you'd better reach for the aspirin—the dangers and opportunities that molecular biology have in store are much more serious. THE EDITOR

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BRASS TACKS

To the Science Fiction Community:

Would you like to see the development of practical space flight during your lifetime?

In the December 1975 issue of Analog, Don Kingsbury published an article entitled "Atomic Rockets" which described a nuclear rocket motor which could very well provide the cost-effective workhorse necessary to make this happen. The dream of opening space to mankind can become a reality, and right now a few independent groups are working toward this goal. They are: 1) The Foundation Institute in Minnesota which is ready to begin the studies necessary to the construction of a prototype.
2) Earth-Space Inc., which focuses on space exploration and development in the private sector.
3) New Worlds Research Foundation, acting to meet fund-raising needs.

Since the corporations and NASA in this country are heavily committed to conventional hardware, the NWRF intends to act as a catalyst for this second phase of Man's ascent to the stars by getting together the people and money necessary to make it happen.

Donald Kingsbury has agreed to coordinate our scientific effort which will be aimed at cooperating with anyone who has a positive contribution toward getting a cost-effective rocket motor space-borne. The magnitude of this effort will depend upon the magnitude of our grass-roots support.

For more information on how you can help, please send stamped, self-addressed envelope to: NWRF, Box 98, Lincoln Park, N.J. 07035

MICHAEL D. ANDERSON
President, NWRF

Dear Ben:

Teaching SF courses are burgeoning! The teaching section at the SFRA at Florida International University in Miami drew a good attendance. Ordinarily such siminars are filled with *desperate* teachers, more willing than knowledgeable (which is why I wrote my textbook), but this meeting was an exception, with teachers who were more experienced both in teaching and in SF than is usually the case (a good sign). Another recent meeting, a one-day workshop sponsored by Marshall Tymm at Eastern Michigan University in Ypsilanti drew over 100 participants from eight states. In addition, of course, everyone wishes Jim Gunn's institute success!

I was especially arrested by your comment on Jim's institute; your suggestion to de-emphasize the history of SF as a literary genre while concentrating on the "various fields of human endeavor that *make* science fiction: such as scientific re-

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search, sociology, politics, history, technological developments . . ." You then spoke out for the examination of the "techniques of team teaching SF with contributions from each of these fields as well as from English literature."

That's exactly what I'm going to try to do next summer, not in competition with Jim's institute, but with a group of *prospective* rather than actual, teachers. These prospective teachers will be high school sophomores and juniors enrolled in Northwestern University's School of Education Division of the National High School Institute, an intensive five-week summer session titled "Education in Orbit: The Many Futures of Teaching." Emphasis will be on futuristics, computer-aided instruction, multimedia techniques, and science fiction in the classroom (an interdisciplinary approach)—and we *will* use Analog as a text; so you can sign us up now!

Also we're interested in any suggestions, and potential students from among your readers.

BEVERLY FRIEND
School of Education
Northwestern University
Evanston, Illinois 60201

If science fiction classes are to develop into something more than a "pastime" for the students, efforts like this will be invaluable.

Sir:

Very clever. "The Perfect Cop." Suddenly police are arrested for resisting arrest—a charge formerly reserved for the poor and non-white. Suddenly rich folks are booked on charges normally used strictly to harass the poor and non-white.

Clever too H.H. Morris, who is, no doubt, white and middle class. His old double standard can't survive an impartial application of the law. When the cop is judge and jury during the arrest stage, Morris wants discretion—discretion that puts the poor in jail while freeing the "good old boy" rich.

Good system if you're on the right side.

A greater mind than Morris' might see that the fault is in the law, not the enforcement. Remove bad laws; then enforce the good ones just the way the Humintecs did. Everyone then gets his day in court for his extenuating circumstances, and we have "justice for all."

If "The Law" put away the rich criminals with the same regularity as the poor, would the example set cause a decrease in crime?

Just possible.

THOMAS H. HARTMAN
2822 Octavia St.
San Francisco, Calif. 94123

Everyone wants strict and impartial law enforcement—for everybody else.

Dear Mr. Bova:

Perhaps a better title for the February editorial would have been "The *Great* Equalizer," for in truth, technology has given us newer and better ways of killing each other. The "evolution" from primitive sling to nuclear weaponry has only been a material one; the ideology behind them—the killer instinct—has remained the same.

The new equality between the

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rich, industrial nations and the "poor" producer nations—due in part to the economic initiatives taken by producer nations with nuclear allies—has visibly increased the danger of nuclear annihilation, as you mention in the editorial. At first thought, the increasing universality of nuclear weapons throughout the world would act as a deterrent to the use of a weapon that would cause immediate retaliation in kind, culminating in the world's destruction. Yet the possibility remains that a foreign leader or official, pixilated with power in a country possessing the Bomb, could threaten the world with a nuclear holocaust—even to the point of starting one. And the probability increases as nuclear weapons are placed in the hands of more and more governments around the world. Somehow, the thought of nuclear weapons in the hands of an Idi Amin is too much to bear!

This is not enough to make me one of technology's detractors—far from it. I would be remiss in overlooking the fact that technology has given us newer and better ways of *living*. Technological progress has provided us with nearly every aspect of daily comfort—food, clothing, housing, light, warmth, entertainment . . . the list goes on. In time, it could give us feasible substitutes for natural sources of energy; one of the many endeavors in this direction is the Exxon-funded Laser Fusion Feasibility Project here at the University of Rochester.

What we really need is a healthy ambivalence toward technological progress—not a fear born of ignorance or a fanatic's unthinking approbation.

KEITH A. DANIELS
P.O. Box 5321
River Campus Station
Rochester, N.Y. 14627

The point is, technology is a tool, like the sticks that chimpanzees use to dig up termites for their lunch—or to throw at leopards that threaten their group.

Dear Mr. Bova:

Daniel P. Dern telling of the revolutions to come in biochemistry with his story "Love For All And All For Love" chose the wrong carrying agent for the "phenomenal pheronone!" DMSO, short for dimethylsulfoxide, a solvent in the paper industry and one-time anti-inflammatory, causes corneal opacity. The frequent lovers would have to find one another by odor since they certainly wouldn't be seeing one another.

IAN D. WEITZ
150-26 61st Rd.
Flushing, N.Y. 11367

Haven't you heard that love is blind?

Dear Ben:

I greatly enjoyed Richard Carrigan's article "The Discovery of the Gypsy" in the February issue of Analog. . . . But, you know there *is* a theory to explain why magnetic monopole sisters to protons or electrons should not exist!

Dr. F. J. Tipler, of the University of Maryland, published this work in 1975 in the reputable journal *Il Nuovo Cimento* (volume 26B, p. 446), drawing, it must be admitted, on the currently rather less fashion-

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able idea of direct interaction electrodynamics, the alternative to conventional field theory which has been supported by, among others, Sir Fred Hoyle. In field theory, electromagnetic waves are completely symmetrical between their component electrical and magnetic fields, which leads to the hand waving argument that if electrical poles exist so should magnetic poles. Tipler turns the argument around, arguing that if we do *not* see magnetic monopoles then maybe the theory is wrong and there are no electromagnetic fields around after all. This is the fundamental basis of the direct particle or action at a distance idea, which says that electromagnetic fields do not exist, only charged particles whose path in space time are defined by a principle of least action. And try as he might Tipler has found no way of incorporating magnetic monopoles into the theory.

With the best bet at the time of writing seemingly that the monopole discovery claim was made a little hastily in the heat of the moment, maybe the negative results of all those experiments are telling us that we've been barking up the wrong theoretical tree with the idea of electromagnetic waves for the past hundred years—but, of course, either way the wave theory is fine for practical purposes, just as Newtonian mechanics is fine for bridge builders even though Relativity is a better description of the universe. This exciting area of research certainly deserves close attention—keep up the good work.

DR. JOHN GRIBBIN
University of Sussex
Science Policy Research Unit
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England

The monopole "discovery" still hasn't been verified, true enough. But the implications of the existence of magnetic monopoles are so fascinating that we'll have a fact article on the subject in an upcoming issue.

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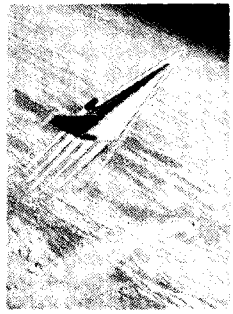

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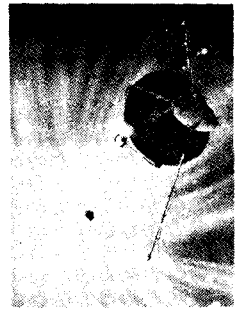

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